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ANNALS

OF THE

CARNEGIE MUSEUM

87

VOL. XIX

1929-1930



W. J. HOLLAND, *Editor*

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LIST OF GENERA AND SPECIES NEW TO SCIENCE DESCRIBED IN THIS VOLUME.

Class MAMMALIA (Fossilia).

Order MARSUPIALIA.

Family DIDELPHYIDÆ.

Genus EUANGELISTES nov.

E. petersoni Simpson, sp. nov., p. 108.

Order INSECTIVORA.

Family PLESIADAPIDÆ.

Labidolemur kayi Simpson, sp. nov., p. 120.

Class BATRACHIA (Recentia).

Eupemphix ruthveni Netting, sp. nov., p. 167.

Class INSECTA.

Order LEPIDOPTERA.

Family NYMPHALIDÆ.

Brenthis myrina, var. *jenningsæ* Holland, var. nov., p. 36.

B. myrina, var. *nebraskensis* Holland, var. nov., p. 36; *B. myrina*, var. *terræ-novæ* Holland, subsp. nov., p. 36; *B. albequina* Holland, sp. nov., p. 40; *B. do.* var. (? ab. ♀) *baxteri* Holland, p. 42.

Brenthis frigga, var. *lehmanni* Holland, var. nov., p. 44.

(= *B. frigga alaskensis* Lehmann, = *B. frigga gibsoni* B. & B., which latter has priority).

Brenthis bellona toddi Holland, subsp. nov., p. 45.

Brenthis bellona, ab. *pardopsis* Holland; ab. nov. p. 45.

Melitæa gilensis Holland, sp. nov., p. 156; *arachne* var. *gunderiæ*, Holland, ab. nov., p. 156.

Melitæa harrisi ligetti Avinoff, subsp. nov., p. 161.

M. harrisi albimontana Avinoff, subsp. nov., p. 163.

Family PAPILIONIDÆ.

SUBFAMILY PARNASSIINÆ.

Parnassius golovinus Holland, sp. nov., p. 155.

Family HESPERIIDÆ.

Thanaos avinoffi Holland, sp. nov., p. 156.

Erynnis lindseyi Holland, sp. nov., = *ruricola* (Bdv.) auct. nonnull., p. 158.

Poanes hobomok, ♀, var. *alfaratta* Holland, var. nov., p. 159.

Megathymus albocincta Holland, sp. nov., p. 159.

Order COLEOPTERA.

Family GYRINIDÆ.

Gyrinus floridensis Ochs, sp. nov., p. 123.

Dineutus (*Cyclinus*) *emarginatus floridensis* Ochs, subsp. nov., p. 125.

Gyretes lucidus Ochs, sp. nov., p. 128; *multisetosus* Ochs, sp. nov., p. 130; *globosus* Ochs, sp. nov., p. 130.

Orectogyrus patromimus Ochs, sp. nov., p. 133.

Family CERAMBYCIDÆ.

Protorma recurvatum Williams, sp. nov., p. 143.

Order HEMIPTERA.

Family GERRIDÆ.

Limnogonus recurvus Drake and Harris, sp. nov. p. 236.

Limnogonus profugus Drake and Harris, sp. nov. p. 237.

Family NABIDÆ.

Subgenus *Camarochilus* Harris (subgen. of *Pachynomus* Klug) subgen. nov., p. 241.

Camarochilus americanus Harris, sp. nov., p. 242.

Camarochilus confusus Harris, sp. nov., p. 243.

Pagasa bimaculata Harris, sp. nov., p. 244.

Nabis seticrus Harris, sp. nov. p. 247.

DATES OF ISSUE AS SEPARATES.

Art. I.	Oct. 10, 1928.	Art. X.	Jan. 21, 1930.
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Art. VIII.	May 14, 1929.	Art. XVII.	June 30, 1930.
Art. IX.	May 22, 1929.	Art. XVIII.	June 30, 1930.
		Art. XIX.	June 30, 1930.

ERRATA AND CORRIGENDA

- p. 37. 7th and 5th lines from bottom, for *andersoni* substitute *kriemhild*.
- p. 90. 7th line from bottom, for "Carnax" read Caranx.
- p. 133. 16th line from top, for "Kamarus" read Kamarun.

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VOL. XIX, No. 1



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ANNALS

OF THE

CARNEGIE MUSEUM

VOLUME XIX, NO. 1

EDITORIAL NOTES

At the Commencement of the University of Pittsburgh, which was held on June 13, 1928, it became the agreeable duty of the Editor of the Annals to make the commencement address and to witness the conferring of the degree of Doctor of Science upon that most valued and generous friend of the Museum, Mr. Benjamin Preston Clark, of Boston. He was presented to the Chancellor in an appropriate introductory address by Dr. Avinoff. The great collection of the *Sphingidæ* made by Mr. Clark is gradually being transferred to the final custody of the Carnegie Museum.

With kindness, which is most sincerely appreciated, the Trustees of the University conferred upon the Editor of the Annals the degree of L. H. D. (*Litterarum Humaniorum Doctor*). After nearly forty years of connection with the University as Trustee, during ten of which the writer had the honor of serving as Chancellor, this act of recognition, coming close upon his eightieth birthday, is sincerely accepted as a token of good will on the part of the distinguished body of his fellow students, who have done and are doing so much for the upbuilding of science, art, and general culture in this wonderful community.

Mr. John B. Semple fired by his love of exploration, accompanied by Mr. W. E. Clyde Todd, Kenneth Doult, and George M. Sutton, has just returned from an ornithological exploration of eastern Quebec and southern Labrador, where the party visited those regions

which can be most easily reached from the Gulf of St. Lawrence. With his usual generosity Mr. Semple financed the expedition, for which the friends of the Carnegie Museum unite in expressing to him their most grateful appreciation.

The ultimate destination of the expedition was the region recently made famous by the near-tragic trans-Atlantic flight of the aeroplane "Bremen," which terminated on Greenley Island. In fact, fragments of the wing of one of the planes, which was wrecked while attempting to rescue the crew of the "Bremen," were found by our party on a rocky island near that spot. From Natashquan, about five hundred miles northeast of Quebec, in a boat chartered for that purpose, the north shore of the Gulf of St. Lawrence was examined for a distance of about one hundred and fifty miles, as far north as Harrington Harbor. The conditions of the ice at first made traveling dangerous and somewhat retarded progress. Heavy rains added to the difficulty of collection, and the advent of spring brought with it the myriads of black flies and mosquitoes for which Labrador is unpleasantly noted.

The expedition was primarily concerned with the study of birds, and the bulk of the collection consists of approximately four hundred bird skins and one hundred sets of eggs, in addition to one hundred and twenty-five mammals and many plants and insects. The collection is particularly rich in sea-fowl and there is a fine series of the Great Black-backed Gull, the "pirate of the Gulf," which destroys the eggs of Eider Ducks and Murres, when they are left unprotected. Another interesting bird collected was a Hawk Owl, which defies its family tradition by habitually hunting during broad daylight. On many of the rocky islets colonies of nesting sea-birds were found, among which were large numbers of the American Eider, a habitat group of which is soon to be on exhibition in the Carnegie Museum. The European Cormorant, one of the rarest of American birds, was observed at the only locality where it now breeds in the New World.

This part of the coast of the Gulf of St. Lawrence is unusually interesting, because the ice brought in by the Arctic current retards the seasons and creates on the off-shore islands a life-zone similar to the northern Barren Grounds, while the adjacent mainland is a typical Canadian spruce-forest; and thus the anomaly of a colder zone south of a warmer zone is brought about.

For the last twenty-five years Mr. Todd has studied the avi-fauna of the Labrador Peninsula, and in that time has made numerous ex-

peditions to Hudson and James Bays and to the eastern coast of Labrador. In 1917 he headed an expedition, which was the first to cross the interior of the peninsula from the St. Lawrence to Davis Strait. The trips in recent years have been made possible through the generosity of Mr. Semple, who each time has been a member of the party. Mr. Sutton, formerly a member of the ornithological staff of the Museum, now connected with the Board of Game Commissioners of Pennsylvania, has also accompanied Mr. Todd on two other trips.

Mr. Ernest G. Holt, together with Mrs. Holt, sailed on June 4th for his explorations in Venezuela, under the joint auspices of the Carnegie Museum and the National Geographic Society, which is contributing \$5,000 for this purpose. This expedition is further assisted by two Trustees of the Carnegie Museum, Mr. C. D. Armstrong and Dr. George H. Clapp, each of whom give \$500 this year. The Aluminum Company of America very generously offered free transportation on one of the ships of the "Aluminum Line" from Mobile to LaGuayra; and the H. J. Heinz Company donated twenty-four cases of food-products, which will probably serve as supplies of their kind for a year.

Through the generosity of Mr. Herbert DuPuy the Museum has been enabled to acquire the scientific library of the late Dr. Arnold E. Ortmann. This noted naturalist, who for many years was the Curator of Invertebrates in the Carnegie Museum, was widely known in America and Europe as one of the leading authorities upon the Invertebrata and upon Zoögeography. His studies of the Crustacea and the Distribution of Freshwater Mollusca are classic. Dr. Ortmann's collection of books and pamphlets comprises over thirty-six hundred titles, chiefly relating to those subjects in which he specialized. Its accession to the library of the Museum constitutes a precious addition to the papers, which must be consulted by the student in those fields of research in which Dr. Ortmann rose to international eminence.

Numerous visitors of distinction were welcomed at the Museum in May and June. Besides many American friends, professors in universities and scientific specialists, who have arrested their progress through Pittsburgh to spend a few hours or a few days in consulting

the books and the collections in the Museum we have had the honor of greeting and entertaining a number of friends from across the seas.

On June 23rd Mr. James Norval, formerly Provost of the City of Dunfermline, Scotland, and most active and influential as a Trustee in all of the foundations created by Mr. Andrew Carnegie in the United Kingdom, arrived in Pittsburgh. The Editor of the *Annals*, in his capacity of President of the Carnegie Hero Fund in North America, promptly called to pay his respects to the President of the Carnegie Hero Fund in the United Kingdom. The 24th being Sabbath, Provost Norval repaired with the writer of these lines to the Bellefield Presbyterian Church, where we heard a good sermon by the pastor, a Scot of American adoption. The rest of the day was spent in the company of Mr. F. M. Wilmot, the Secretary of the American Hero Fund, and at the home of the writer. On Monday Mr. Norval visited the various departments of the Carnegie Institute as the guest of the Trustees, saw something of the great industrial establishments founded by Mr. Carnegie, and in the evening dined at the Pittsburgh Golf Club in company with a goodly gathering of the Trustees of the Institute, and the Heads of Departments. Colonel S. H. Church presided and acted as toastmaster. Those who were present will always carry with them delightful memories of the graceful address made on the occasion by Mr. Norval, by way of an after-dinner speech.

On the same day, June 25th, Vicomte Guillaume de Spoelberch, of Wespelaer, Belgium, at the invitation of Mr. Howard Heinz, called at the Carnegie Museum and was shown through the galleries by the Director, Dr. Avinoff. The Viscount expressed himself in terms of highest appreciation as to what he had seen.

To be perfectly frank, while we have rejoiced to welcome our foreign friends, the most significant visitors have been American men of science, paleontologists, entomologists, ornithologists, and botanists, who have spent days and even weeks with us, studying the scientific treasures which have been amassed during the brief years in which the Museum has had its being, but which they find that they must consult, if the work they are doing is to claim authority.

The Editor of the *Annals*, with the hesitation which modesty inspires, nevertheless with pardonable pride, records the fact that at the last Annual Meeting of the American Philosophical Society he

had the honor to be elected to membership. The American Philosophical Society, in establishing its claim to be the oldest scientific organization in the United States, traces its descent from "The Junto," a club formed in Philadelphia by youths bent upon self-improvement, *i. e.* adult education. In this club Benjamin Franklin, a young printer, took an active part. One of the coterie was a shoe-maker by the name of William Parsons. Franklin called him "our geographer." He forsook his last and took up the surveying of land. He presently was made by the Penns their agent to lay out lands and locate towns and highways. He received the title of "Surveyor General to the Proprietors." He laid out Easton, Pa.; made his home there in the later years of his life; did much for the defence of the frontier settlements at the time of the French and Indian War; and, dying, was buried at Easton, where his tomb may be seen near the entrance to the "Carnegie Free Library." The great-great-grandfather of the writer of these lines was the Executor of the last Will and Testament of this original member of "The Junto," and a large body of the papers of William Parsons are in the possession of the Editor of the Annals. The daughter of William Parsons married the eldest son of Colonel Horsfield of Bethlehem, Pa. Their son, Dr. Thomas Horsfield, was for fifty years the Curator-in-chief of the Museum of "The Honorable The British East India Company" in London. He was the author of a number of important works upon the zoölogy and the botany of Java and the East Indies. The tales of the discoveries and researches made by "cousin Thomas," heard by the writer of these lines when he was a boy, did much to create in him his life-long enthusiasm for the study of nature. And now the circle closes, and the Director Emeritus of the Carnegie Museum in Pittsburgh on the Ohio becomes a member of the Association, one of the original founders of which was William Parsons, whose ashes sleep by the doorway of the Carnegie Library in Easton on the Delaware.

The Fourth International Entomological Congress was held at Cornell University, Ithaca, New York, on August 12-18, 1928. It was the largest gathering of entomologists which has thus far taken place in the annals of mankind. Over six hundred professional entomologists and students of the science were congregated on the occasion. About one hundred of the delegates came from foreign lands, some of them accompanied by their wives and daughters.

The local Committee was composed of the following: Prof. James G. Needham, Chairman; Prof. Glenn W. Herrick, Vice-Chairman, Prof. P. J. Parrott, Vice-Chairman; Prof. C. J. Crossley, Treasurer; Prof. E. F. Phillips, Chairman Committee on Program; Prof. P. W. Claassen, Chairman Committee on Local Arrangements; Prof. O. A. Johannsen, Local Secretary.

It is impossible to convey in adequate terms the appreciation which was felt by everyone at the admirable manner in which the above committee provided for the wants of this polyglot assemblage coming from all parts of the world. Every contingency was anticipated. Cornell University possesses in Willard Straight Hall a building wonderfully adapted to help in the entertainment of guests. Here were the headquarters of the Congress. Registration took place in the Entrance hall where was a postoffice, a telegraph-office, a general railway ticket-office, bureaus of information, with courteous attendants, able to answer all inquiries. The great Memorial Hall furnished accommodations for various gatherings and for the banquet on the evening of the 18th and the service in the cafeterias and the dining-halls was all that could be desired. Those who had the privilege of finding their rooms assigned to them in this building discovered that they were in quarters equal to those provided by the best hotels in the country. The delegates found without exception pleasant accommodations, which were supplied not only in Willard Straight Hall, but in the various dormitories, all of them most pleasantly located and furnished.

The first general session was held in the great auditorium of Bailey Hall, too large even for so great a gathering. The subsequent general sessions were held in the large auditorium of Baker Laboratory, not as large as Bailey Hall, but equal to the needs of the Congress. The sections met in various rooms of the Baker Laboratory and Rockefeller Hall.

Dr. L. O. Howard, who for decades has been the head of the Bureau of Entomology in the United States Department of Agriculture at Washington, but who has just relinquished many of the burdens of his post to his successor, Dr. C. L. Marlatt, presided with great dignity and grace at the opening session on Monday, August 13th, and at the closing session on the afternoon of August 17th. It fell to the lot of the Editor of the Annals to preside at the general session held on August 14th. There was no general session held on August 15th, the

Congress adjourning on that day to the New York Agricultural Experiment Station at Geneva, whither they were conveyed by special train. On August 16th Prof. Filippo Silvestri of Naples, presided. Many sectional sessions were held in various University halls where specialists discussed those subjects in which they are most interested. A large series of valuable papers were read both at the general and at sectional meetings, which will be published in the "Proceedings" of the Congress, shortly to be issued.

The attendance of delegates from foreign lands was in view of all the circumstances quite remarkable. At the first International Entomological Congress held at Brussels in August 1910, the only American countries represented at that great gathering, were Argentine, represented by Prof. F. Lahille, Canada represented by the late H. H. Lyman, and the United States represented by Prof. Herbert Osborn, Dr. Henry Skinner, and the writer. So, at the first Congress there were but five delegates from the Western Hemisphere. At first it seemed doubtful whether foreign lands could be induced to send delegates to America. An appeal was made to the Carnegie Endowment for Promoting International Peace and Goodwill for an appropriation to aid a number of foreign entomologists to make the journey across the Atlantic. This request was generously met. The effect of this gift was not merely to provide means for the transportation of a limited number of men distinguished for their scientific attainments, but poor in purse; but it stimulated many of the European governments to appoint or provide for the expenses of delegates officially representing them. Some of these governments appointed their consuls resident in the United States, others sent delegates directly from the various museums and departments of agriculture under their control. There were a number of men of means who came at their own charge. The result was that about forty nationalities, besides the United States, were represented at the Congress. There were representatives from as far off as Japan, New Zealand, Australia, South Africa, Egypt, and the East Indies, thirty-nine states of the American Union, and Hawaii and Porto Rico. The South and Central American countries represented were Guatemala and Mexico, as well as several others through their consuls. Numerous excursions in the vicinity of Ithaca were provided. On the 15th, as already stated, the entire Congress went for the day to Geneva, New York, to inspect the New York State Agricultural Station. On the afternoon of the 14th

the Congress adjourned about the middle of the afternoon and repaired to Taughannock Glen and Cascade, where, after inspecting the falls, they assembled on the border of Lake Cayuga and picnicked. After the evening meal they were entertained by members of the Onondaga tribe of Indians, who, standing on an elevated platform, sang the songs of their people and danced in Indian costume. Appropriate explanations of Indian life and customs as well as the story of the Indian tribes on the continent were briefly given in English by one of the members of the Faculty of Cornell belonging to the Department of Ethnology. All this was very much to the edification of those from foreign lands. Excursions were provided for those who wished to visit Chicago by way of Niagara. The excursion which seemed to most interest the foreign visitors was that planned to go by special cars to Niagara, Buffalo, Pittsburgh, Washington, Philadelphia, and New York, with a detour to Boston for those who wished to visit that city. In the early morning of August 20th about forty foreign delegates, representing sixteen different nationalities, arrived in Pittsburgh,

They were met at the B. & O. R. R. Station by a Committee headed by Mr. A. S. Coggeshall and taken to the University Club, where Dr. Avinoff had arranged that they should find headquarters.

The forenoon was mainly devoted to a tour of inspection through the different Departments of the Institute and the Library. Astonishment at the beauty of the galleries and the perfection of the means of service was frequently expressed. Luncheon was provided in the Cafeteria. The early part of the afternoon was taken up by a ride through the parks, giving glimpses of the great manufacturing establishments along the rivers, through the heart of the old city, and on and up to Mt. Washington, where a birds-eye view of the entire city was obtained. The party then returned to the Museum, where the latter part of the afternoon was spent by most of the visitors in examining the great collections in the Entomological Laboratory.

In the evening our visitors and a number of their Pittsburgh acquaintances were entertained at dinner by the Director Emeritus of the Museum, who deeply regretted that his efforts over the telephone to assemble a larger company had failed, because of the absence from town of many, whom he attempted to invite.

THE GUESTS AS SEATED AT THE DINNER GIVEN AT THE UNIVERSITY CLUB
PITTSBURGH, PENNSYLVANIA, BY DR. W. J. HOLLAND, HONORARY
MEMBER OF THE INTERNATIONAL ENTOMOLOGICAL
CONGRESSES, AUGUST 20th, 1928, 7 P. M.

Mr. G. Fox-Wilson, Royal Horticultural London, England.	Mr. W. Banks, Carnegie Museum.	Mrs. R. Boulton, Carnegie Museum.	Mr. H. Klages, Carnegie Museum.	Mr. O. A. Peterson, Carnegie Museum.	Mr. M. G. Netting, Carnegie Museum.
Mr. A. S. Coggeshall, Carnegie Museum.	Mr. L. S. Coggeshall, Carnegie Museum.	Prof. S. H. Williams, Univ. Pittsburgh.	Dr. I. A. Parventiev, University of Moscow.	Mr. R. Boulton, Carnegie Museum.	Prof. R. T. Hance, Head Dep't of Zoology, University of Pittsburgh.
Dr. A. B. Martynov, National Acad. Science, Leningrad.	Prof. Dr. Zaitzev, Polytechnic Institute, Tiflis, Caucasus.	Dr. N. A. Kennet, Re- search, Stockholm, Sweden.	Dr. F. Stollwaag, Prof. Viticulture, Neustadt, Germany.	Prof. Dr. Bogdanov- Kat'kov, Institute Applied Zoology, Leningrad.	Dr. G. Ceballos, Museo Nacional, Madrid.
Mrs. F. M. Wilmot, Pittsburgh, Pa.	Dr. Hugo Kahl, Curator of Entomologi- cal Collections, Carnegie Museum.	Dr. Max Dingler, Dep't of Forestry, Univ. of Giessen.	Dr. P. Vayssière, Ministry Agriculture, Paris.	Dr. P. I. Adrianoff, Dep't. Agriculture, Moscow.	Dr. Robert Regnier, Inst. Agron. Research, Rouen, France.
Mr. O. W. Richards, London.	Dr. René G. Jeannel, National Museum, Paris, France.	Dr. G. Enderlein, Nat. Museum, Berlin.	Mr. P. Lathy, Paris, France.	Madame Regnier, Rouen, France.	Dr. I. P. Tolmachoff, Carnegie Museum and University of Pittsburgh.
Miss E. D. Gill, Secretary to the Director Emeritus, Carnegie Mu- seum.		Mr. G. Talbot, Hill Museum, Witley, Surrey, England.	Dr. Antoine Ball, Ent. Soc. of Belgium, Bruxelles.		Baron von Rosen, Univ. of Munich, Germany.
Mr. F. M. Wilmot, Secretary Carnegie Fund Commission.		Dr. U. Saalas, repre- senting Gov't. of Finland.			Miss E. McCalla, Secretary to Director, Car- negie Museum.

Dr. H. C. Efflatoun Bey,
Ministry Agriculture,
Cairo, Egypt.

Miss Elizabeth Skwarra,
Kultus Ministerium, Berlin.

Dr. Andrey Avinoff,
Director Carnegie Museum.

Prof. Rimsky-Korsakov,
Univ. of Leningrad.

Capt. N. D. Riley,
British Museum, London.

Dr. Geo. H. Clapp,
Chairman Committee of
Trustees, Carnegie Mu-
seum.

Prof. Dr. E. L. Bouvier,
Ministry Public Instruc,
Paris, France.

Dr. W. J. Holland.

Dr. C. Bolivar y Pieltain,
Museo Nacional, Madrid,
Spain.

Chancellor J. G. Bowman,
University of Pittsburgh.

Prof. L. E. S. Eastham,
Cambridge University,
England.

Prof. W. Roepke,
Wageningen, Rep. Gov't of
Netherlands.

Dr. Alfons Dampf,
Federal Bureau Agricul-
ture, Mexico.

Dr. E. Gridelli,
Genoa, Rep. Civic Mu-
seum, Genoa, and Entom.
Soc. of Italy.

Dr. M. Thomsen,
Copenhagen, Royal Veteri-
nary and Agricultural Col-
lege of Denmark.

I. TESTIMONIAL TO DR. HOLLAND ON HIS EIGHTIETH BIRTHDAY.

BY A. AVINOFF.

(PLATE I.)

The Eightieth Birthday of our Director Emeritus, Dr. William J. Holland, found him in the best of health and amidst the most congenial surroundings. He was at the time in the company of the largest assemblage of entomologists which has ever convened on this old globe. His birthday, the Sixteenth of August, fell in the middle of the week, during which the Fourth International Congress of Entomologists was in session at Ithaca, New York. Upon the motion of Dr. Karl Jordan, of England, the Congress by acclamation elected Dr. Holland an Honorary Life Member of the Congresses, the first of which he helped to organize. Dr. Holland shares this exceptional honor, which is very rarely conferred, with but two other Americans.

Dr. Holland took an active part in the proceedings of the Congress, presiding on Tuesday, the 14th, over the general session, participating in the deliberations of the Committee on Nomenclature; on the 16th reading a paper on "The Mutual Relations of Museums and Specialists;" and on the 18th upon "Types."

On the evening of the 16th a testimonial dinner was arranged by some of the closest friends and admirers of Dr. Holland. Dr. L. O. Howard, the former Chief of the Bureau of Entomology in Washington, President of the Congress, and Dr. Karl Jordan, Permanent Secretary, with their daughters, were present, together with several representatives from the leading foreign museums. The entomologists from Pittsburgh participated in the dinner. The Director of the Carnegie Museum, after the birthday candles had been blown out, and the birthday cake cut, on behalf of the Staff of the Carnegie Museum and the Trustees of the Institute forming the Committee on the Museum, read the address, which is engrossed on the testimonial, as follows:

"The Carnegie Museum, created by you and brought largely by your efforts to its present high standard of scientific merit and educational efficiency, salutes you cordially and devotedly on your Eightieth Birthday. We are proud of your achievements and leadership in so many fields during these years of fruitful and diligent work. As Minister of the Gospel you have always closely interwoven your life with that of the Church, and you have consecrated yourself whole-heartedly to the study of the wondrous realm of Nature. Your place in the forefront of Science is worthily and universally recognized. You are eminently identified with the cause of Education. You have contributed generously and enduringly to the progress of our Community. Your attainments are blossoming richly in the ripe age of your life, when the anniversary of your fourscore years finds you as active and vigorous as ever, engaged in the numerous absorbing tasks, which are the joy of your life and the inspiration of your friends, admirers, and collaborators. As a widely renowned scientist and educator, as an accomplished man of letters, as a prominent churchman and citizen, you have been honored with many just tributes on the part of civic bodies and seats of higher learning in this country and in foreign lands. In trusting that you may be spared for many, many, useful years to come, we shall continue as ever to hold your name, not only high in our unanimous and profound esteem, but deep and secure in our hearts.

Long live our respected and beloved Dean!"

The parchment was entirely prepared by the members of the Staff of the Museum. The beautiful Gothic lettering was executed by Mr. Rudyerd Boulton, and the writer made the illuminations on the borders. These attempt to illustrate some of the numerous achievements of Dr. Holland in the great variety of fields in which he has worked. On the margins are depicted representative forms of the various animals, living and extinct, which have been described by Dr. Holland, as well as many plants and animals of various orders which bear his name, having been described and named by other authors in his honor. The decorations also allude to the many public honors which have been awarded to Dr. Holland, including his honorary degrees from foreign and American universities and the orders of chivalry given him by foreign governments in recognition of his signal services to science.

During the Congress, besides the Dean of our institution, Dr. Holland, and the Director, the Carnegie Museum was represented by the Curator of Entomology, Dr. Hugo Kahl.

On the Twentieth of August about forty members of the Congress

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DOCTOR HOLLAND

The Carnegie Museum, created by you and brought largely by your efforts to its present high standard of scientific merit and educational efficiency, salutes you cordially and devoutly on your Eightieth Birthday. We are proud of your achievements and leadership in so many fields during these years of fruitful and diligent work. As Minister of the Gospel you have always closely interwoven your life with that of the Church and you have consecrated yourself wholeheartedly to the study of the wonderful realm of Nature. Your place in the forefront of Science is worthy and universally recognized. You are eminently identified with the cause of Education. You have contributed generously and endowingly to the progress of our Community. Your attainments are blossoming richly in the ripe age of your life when the anniversary of your fourscore years finds you as active and vigorous as ever, engaged in the numerous absorbing tasks which are the joy of your life and the inspiration of your friends, admirers, and collaborator. As a widely renowned scientist and educator, as an accomplished man of letters, as a prominent churchman and citizen, you have been honored with many just tributes on the part of civic bodies and seats of higher learning in this country and in foreign lands. In trusting that you may be spared for many, many, useful years to come, we shall continue as ever to hold your name, not only high in our unanimous and profound esteem, but deep and secure in our hearts.

Long live our respected and beloved Dean!

Carnegie Museum

Staff of the Museum
Museum Committee
of Trustees

Testimonial presented to Dr. W. J. Holland on his
Eightieth Birthday, Aug. 16, 1928

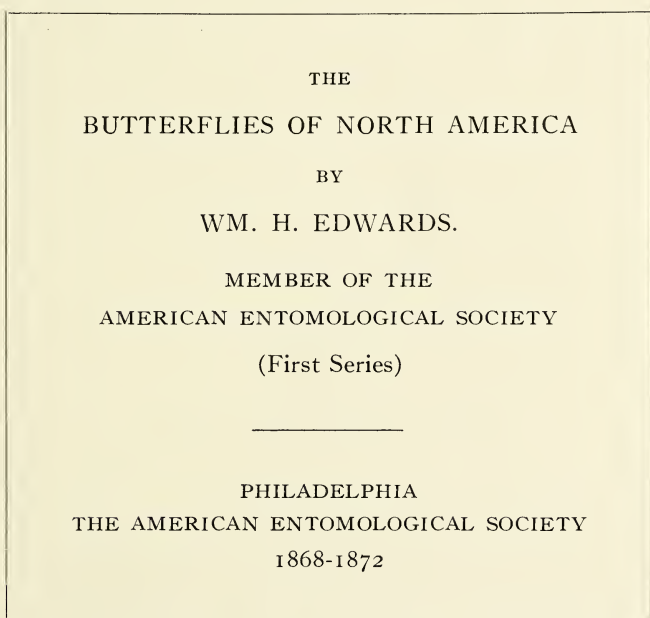
representing sixteen foreign lands, came to Pittsburgh and spent an enjoyable day studying our collections and making a sight-seeing tour of our city. In the evening they were entertained at dinner in the University Club by Dr. Holland. Many representatives of the Museum and the University were present and many who had been invited could not come being absent from the city. Speeches in many languages were made, including an address of welcome by Dr. Holland in Latin, the *lingua universalis* of science. This function ended a memorable day for our guests of honor.

II. THE ARGYNNIDS OF THE NOKOMIS-GROUP.

BY W. J. HOLLAND.

(PLATE II)

In April, 1862, William H. Edwards described an *Argynnis* to which he applied the specific name *nokomis* (Cf. Proc. Acad. Nat. Sci. Philada, XIV, p. 221). His description was founded upon a male specimen. He says "the female I have not seen." He gives as the habitat of the species "Rocky Mountains and Mountains of California." In the year 1868 he began the publication in parts of his great work, "The Butterflies of North America." The original edition of the first volume, which consisted of ten parts and a supplementary part, was issued by The American Entomological Society. The title-page of Vol. I is as follows:



The first cover-page of the first part issued bears the following:

Price \$2.00

THE
BUTTERFLIES OF NORTH AMERICA
WITH
COLORED DRAWINGS AND DESCRIPTIONS

BY
WM. H. EDWARDS.

PHILADELPHIA
THE AMERICAN ENTOMOLOGICAL SOCIETY
April, 1868.

This first part contained five plates and accompanying text, representing five species of *Argynnis*: *A. diana*, *A. cybele*, *A. aphrodite*, *A. nokomis*, and *A. atlantis*. The first four plates bear the signature of D. Wiest, by whom the figures were drawn. The fifth plate does not bear the signature of the artist, but it may also have been drawn by Wiest; if not by him, by Mary Peart. The plates in the nine following parts and the supplementary part were all executed by Mrs. Peart. Part 10 was issued in July, 1872. The front cover-page of this part does not differ in any respect from that of Part I, except that the price printed in the upper right hand corner is "\$2.50" to which figure all but the first two parts had been raised with the issue of Part 3 in December, 1868. The back cover-page of Part 10 bears the following:

"NOTICE TO SUBSCRIBERS

"It was intended to issue the new plates of *Argynnis Diana* and *Leto* with Part 10, according to notice heretofore given. But within the last two months specimens of *Argynnis Nokomis*, of both sexes, have been received from Arizona, and the female being remarkable for its coloration, belonging to the same group with *Leto*, and in some respects resembling *Diana*, it was deemed of importance to redraw the plate. Therefore it was concluded to deliver this Part immediately, and as soon as possible follow it with a supplementary number, con-

taining the plate of *Nokomis* furnished gratis to each subscriber, and the other two to such as have ordered them. The title page and Index will then also be given."

The supplementary part appeared in November, 1872, and contained plates of *Argynnis diana* and *Argynnis nokomis* drawn by Mrs. Peart, intended to replace the plates of these species originally figured by D. Wiest, and a plate of *A. leto* originally drawn by Mrs. Peart, but in which the female represented a worn and rubbed specimen. The first plate of *A. leto* had been issued in Part 4, in April, 1869. The text issued with these plates was slightly revised and modified to meet the circumstances.

The plate entitled "Argynnis IV," in the Supplementary Part represents both the upper and under sides of both sexes of what Edwards regarded as his species *nokomis*, based upon "five ♂, 2 ♀, brought from Arizona by the Exploring Expedition under Lieut. Wheeler in 1871, but with no further intimation of their locality." Three of these males and the two females labelled "Arizona" still remain in the Collection of William H. Edwards, as I received it from him. Two of the males he may have parted with in exchange, or by gift, before I bought his collection. At later dates he received specimens of the same butterfly from southern Utah. These are labelled "A. nokomis" in his familiar handwriting. There are altogether nine specimens of *A. nokomis*, males and females, labelled by Edwards, in the long series which I possess, and agreeing with the description, which he published in 1862, except for a slight discrepancy, of which I shall speak later, and also agreeing with the redescription and the plate by Mrs. Peart, which was issued by Edwards in 1872. In addition to these specimens labelled by W. H. Edwards, I have others from Arizona collected by Morrison, and a number from California, collected by the late W. G. Wright, and purchased by me from him.

In 1874, two years after the publication of his revised and completed description of *A. nokomis*, accompanied by the plate by Mrs. Peart, showing the upper and under sides of both sexes of that species, and eleven years after he had published his first description of *A. nokomis*, W. H. Edwards published his first description of *A. nitocris* (Cf. Trans. Am. Ent. Soc., V, p. 15). The type of this species is a male. Edwards in speaking of it says that his description is based upon "one male, taken at White Mountains, Arizona, by Lieut. Henshaw of the Exploring Expedition under Lieut. Wheeler, August,

1873." This specimen he figured in *The Butterflies of North America*, Vol. III, 1887, "Argynnis, Pl. I," on which plate he also gives figures of both the upper and under side of the female of the species. In the *Butterfly Book*, published by me in 1898, Plate XIV, fig. 4, I gave a representation of the under side of this identical specimen, the "type," produced by color-photography. Any student can see at a glance by comparing the plates of *A. nokomis* and of *A. nitocris* given by Edwards, and the figure of the type of *A. nitocris* in *The Butterfly Book*, that the two species, *nokomis* and *nitocris*, are, as species among the Argynnis run, quite distinct, though related to each other. They belong to a group, to which *A. leto* Edwards and *A. cærulescens* Holland also belong.

In 1918, fifty-six years after W. H. Edwards had published his original description of *A. nokomis*, forty-six years after Edwards had published a revised description of that species, accompanied by a most faithfully executed plate, showing both sides of the two sexes of the species, and thirty-one years after Edwards had given a magnificently accurate plate of *A. nitocris*, my good friend, the late Dr. Skinner of Philadelphia, came across some rejected and cancelled plates of *A. nokomis*, which Edwards had not used and had failed to have destroyed. On the strength of these and the discrepancy between the first and second descriptions of *A. nokomis* published by Edwards Dr. Skinner reached the conclusion:

1st. That the original description of *A. nokomis* refers to the insect at a later date named *A. nitocris* by Edwards;

2nd, that *A. nitocris* is a synonym of *A. nokomis*;

3rd, that in consequence the butterfly named and figured as *A. nokomis* by Edwards was without a name. Dr. Skinner accordingly proceeded to rebaptize *A. nokomis* of Edwards as *A. apacheana* Skinner. He sent a pair to the late Charles Oberthür of Rennes, who figured the insect in his *Lépidoptérologie Comparée*, Fasc. XXI, 1923, p. 160, Pl. DLXX, figs. 4811 and 4812. The figures given by Oberthür are rather gaudily colored, showing on the under side of the male an excess of green, and in this respect differing not only from all specimens in the Edwards Collection, but also from the specimen in Skinner's Collection, which he has labelled as the "type" of *A. apacheana*, and which I have recently critically examined. Oberthür's artist probably did the coloring "by prescription." Comstock in his *Lepidoptera of California*, has followed Skinner in calling *A. nokomis*

of Edwards *A. apacheana* Skinner, and so have Barnes & Benjamin, the compilers of the most recently published check-list.

Winn in *The Entomological News*, Vol. XXX, 1919, pp. 156-159, raised the question whether an examination of the original issues of Edwards' *The Butterflies of North America*, if still in existence, might not throw light upon the subject of the identity of *A. nokomis* and *A. nitocris*, which had been affirmed by Skinner. To the queries raised by Winn Dr. Skinner replied in effect that he could throw no light upon the matter beyond what he had already stated in his article in which he had re-baptized *A. nokomis* Edwards as *A. apacheana* Skinner. The recent perusal of Winn's queries and Dr. Skinner's reply thereto led the writer to make an investigation for the purpose of ascertaining whether he could find copies of the original Part I of Edwards' *Butterflies* containing the first plate of *A. nokomis* issued in April, 1868, in which he had figured the "type," the only specimen Edwards had, when he caused the plate to be executed.¹

To his great delight he found that his colleague, Dr. Avinoff, has in his possession a copy of the first volume of *The Butterflies of North America*, which once was the property of R. L. Walker, as the book-plate shows. Dr. Avinoff purchased it in London a number of years ago. The plate "Argynnis IV" is a colored figure of the male type of the species, made by Wiest. On Plate II, accompanying this article, in figs. 1 and 2 I give photographic reproductions of the right side of the type of *A. nokomis*, as shown in Wiest's original colored drawing given in Walker's copy; I also give (fig. 3) a photographic representation of Mrs. Peart's drawing of the under side of the male of *A. nokomis*, as it appeared in the supplementary part of Vol. I of Edwards' work, and as it appears in all the subsequent editions, which were at first issued by the firm of *Hurd and Houghton* of Boston, and then by the successors of that firm, *Messrs. Houghton, Osgood, and Company* and *Messrs. Houghton, Mifflin, and Company*. These gentlemen, to whom Edwards transferred the publication of his work after the issue of the "First Series," or volume, by The American Entomological Society, reprinted in 1879 the whole of Vol. I, and subsequently

¹That the insect delineated by Wiest was the *type* is proved by Edwards himself, who says: "The original specimen from which the description of the species was drawn was received by me in 1862 through the Smithsonian and was labeled 'Bitter Root Mountains.' Until the present year (1872) it has been an unique in my collection, and, so far as I know, not found in any other."

printed and published Vols. II and III. In the reprint of Vol. I by Houghton, Osgood, and Company, in 1879 the plates issued in the supplementary part of that volume by the American Entomological Society are substituted for the plates, which Edwards had discarded. These plates are therefore authoritative. They furnish the final concept in the form of illustration of what Edwards regarded the species *A. diana*, *A. nokomis*, and *A. leto* to be in life.

Now at this point, if the reader will consult Plate II of the present article, and will carefully compare Fig. 2 (Wiest's colored figure of the underside of the *type* of *A. nokomis* Edw. as shown in Walker's copy of the first issue of the plate) with fig. 3 (Mrs. Peart's colored drawing of the under side of the male of the same species) he will find that the two figures are practically identical in all their markings and tones, the differences being so slight as only to be detected by a critical eye, and being scientifically of no moment whatever.

In the supplementary part of Vol. I in the text dealing with *A. nokomis* Edwards speaks in pointed terms of the difficulties he had encountered in finding competent colorists. He also states that all subsequent plates will be executed by Mrs. Mary Peart. The existence in the Library of the American Entomological Society of a large number of rejected plates, furnishes eloquent testimony to the trials which Edwards must have undergone in his first attempt to secure accurately colored plates for the early issues of his now famous book. Through the kindness of Mr. R. C. Williams, Jr., I am in possession of one of these discarded plates. It differs from the plate which is found in Walker's copy, now in the library of Dr. A. Avinoff, in that the extreme outer margin of the hind wing on the under side has been colored deep red, and the median and basal areas are blotched with dark irregular pinkish red markings, which, so far as I know, have never been found on any specimen of *A. nokomis*, and which do not in the slightest degree suggest the under side of the wings of *A. nitocris*, which are solidly dark ferruginous in their ground-color from the base to the outer margin of the median row of silvery spots (Cf. Pl. II, figs. 5 and 6). Edwards apparently did not succeed in preventing some of the erroneously colored plates from getting into circulation. Through the kindness of Dr. Sweet, Librarian of the Museum of Comparative Zoology at Cambridge, I have had in my hands their copy of Vol. I of *The Butterflies of North America* for examination and study. In this copy the rejected plates have been bound in with

the approved plates. The plate of *A. nokomis* in the copy at Cambridge is like the copy of the rejected plate, which I received from Mr. Williams, with slight variations. The outer border (not the "hind border") of the under side of the wing of the male is painted even deeper red, and the dark patches of color, which differ somewhat in outline from those in the plate received from Mr. Williams, are even darker than in the latter plate, agreeing neither with Edwards' original description, nor with anything I have ever seen in nature, nor with the original contained in Walker's copy a photograph of which is given in Plate I.

My inquiries as to original copies of Edwards' work issued by The American Entomological Society were addressed, among others, to the Librarian of Congress. Under date of July 5, 1928, I received an answer, from which I quote as follows:

"According to a report from Mr. Roberts, the Superintendent of the Reading Room, the Library of Congress appears to have no copy of the American Entomological Society's issue of the first series of Edwards' work. Neither has he been able to locate copies in the Union Catalogue of the larger libraries of the country, the Department of Agriculture Library, nor the Smithsonian Institution Library.

"The Superintendent has been informed that Mr. Harrison G. Dyar, of the United States National Museum, owns a copy of what he thinks is the first issue of the first series."

Dr. Dyar writes me that the copy of the First Volume of Edwards' work in his possession does not contain Wiest's original plate, "Argynnis No. IV," but only the plate executed by Mrs. Peart, and issued as a substitute in November, 1872. In this respect Dr. Dyar's copy agrees with the original in the New York Public Library, which I have examined, and which only preserves Wiest's plate of *A. diana* bound in with Mrs. Peart's plate of that species and her revised plate of *A. leto*. Wiest's plate of *A. nokomis* is missing. The only imprint is that of the American Entomological Society in this copy.

In the library of the American Museum of Natural History in New York there is preserved a copy of the issues of the First Series (Vol. I) of Edwards' work in which the original plates are bound in with the substituted plates, and in which the original wrappers of the parts, as issued, are likewise preserved. I am greatly indebted to Miss Ida R. Hood, the Acting Curator of Books and Publications for transcripts of these wrappers, and other valuable information, which she has

most kindly given me, some portions of which I shall publish in a note at the end of this paper. (See p. 28). An examination of the plate executed by Wiest representing the male type of *A. nokomis* in this copy shows that it agrees with the plate in Walker's copy, and therefore with the figure given in Mrs. Peart's revised plate.

The weight of evidence drawn from the copies of the first issue of Edwards' figure of the type of *A. nokomis*, which are still extant, goes to show that, as it was drawn, then lithographed and printed, before it had been touched by the colorist, it was practically identical in every particular with the figure given in the revised plate issued in November, 1872. Of the colored copies which are extant in published sets, two at least, the one in the American Museum of Natural History and Walker's copy, agree with Mrs. Peart's figure of the male both on the under and upper sides.

Turning now from a critical examination of the plates, let us take up the original descriptions of *A. nokomis* and of *A. nitocris*.

Dr. Skinner in his paper published in *The Entomological News*, XXIX, 1918, pp. 67-68, makes the unqualified statement that "There can be no question that the original description of *nokomis* applies to what we know as *nitocris*, and that therefore *nitocris* becomes a synonym of *nokomis*." He states that Mr. R. C. Williams, Jr., had examined the Edwards Collection in Pittsburgh, and that the type of *A. nokomis*, from the "Bitter Root Mountains" could not be found. That statement is correct. No specimen of *A. nokomis* bearing the locality-label "Bitter Root Mountains" was in the Edwards Collection, when I received it. It is not in Washington. Dr. Dyar has searched for it. So far as the lepidoptera of North America are concerned, Dr. Dyar writes me: "there is nothing in Washington antedating the Riley Collection." The type specimen has been lost, whether it was lost in the mails, or smashed in the hands of the draftsman, there is no evidence. That it was what we know as *A. nokomis*, is however proved by a comparison of Walker's copy and the copy at the American Museum of Natural History with the plate executed by Mrs. Peart, ocular proof of which is submitted in this article (Pl. II, figs. 2 and 3). It apparently did not materially differ from the specimen before Mrs. Peart, and her drawing of the male may even have been made from it.

There is only one point at which the original description of *A. nokomis* by Edwards seems to suggest that an insect somewhat re-

sembling *A. nitocris* Edw. was before the author when he penned his description of the former species. It is where he says of *A. nokomis* "Secondaries cinnamon-brown, somewhat mottled with buff, and having a green tinge next abdominal margin." In his description of *A. nitocris* he says: "Secondaries deep ferruginous from base to outer edge of the second row of spots." Dr. Skinner apparently fixed his eyes upon the two words "cinnamon-brown" and "deep ferruginous" and imagined that he had discovered in their use the fact of identity between the two species. He seems to have entirely lost sight of the fact that Edwards adds to the use of the word "cinnamon-brown" the qualifying words "mottled with buff and having a green tinge next abdominal margin." The presence of a slightly "green tinge" is characteristic of very fresh specimens of *A. nokomis*, especially in the female; it is absolutely wanting in all specimens of *A. nitocris*, which have the ground-color of the basal and median areas solidly and uniformly "deep ferruginous," very deep rusty brown, "morocco red" (Ridgway) from the base to the outer margin of the second row of silvery spots. This is true of the "type" of *A. nitocris*, which is before me (See Plate II, figs. 5 and 6). It is not true of the figures of the under side of *A. nokomis*, either in the published or the rejected plates. How my friend, Dr. Skinner, persuaded himself that the original description of *A. nokomis* is a description of "of what we know as *nitocris*" is beyond my ken. I am convinced that in this matter he made an error.

Edwards in his redescription of the under side of the male published in 1872 substitutes for the words "cinnamon-brown mottled with buff, etc." the words "Secondaries uniform golden yellow from base to margin." This description is hardly what I should give. The secondaries are not what I should call "golden yellow," but *pale cinnamon-buff*. This is in fact what appears upon Mrs. Peart's figure, in the copy of Wiest's plate in the Walker set of the first issue, in the copy in the American Museum of Natural History, as well as in the "type" of *A. apacheana*, preserved in the Skinner Collection, which does not differ by an iota from the specimens from Arizona in the Edwards Collection, labelled "*A. nokomis* Type" by Edwards.

I am convinced after a full review of everything, which has been said upon the subject:

1. That Edwards' description of *A. nokomis* as having the under side of the hind wing of the male "cinnamon brown, somewhat mottled

with buff, and having a green tinge next the abdominal margin the hind margin yellowish brown" is *not* descriptive of *A. nitocris*, which he correctly describes as having the under side of the secondaries in the male "deep ferruginous from the base to the outer edge of the second row of spots."

2. According to Edwards the only specimen of *A. nokomis* in his possession until 1872, was the unique type of the male. This he caused to be figured by Wiest, and published to the world in 1868. Wiest's figure of the male, as shown in two of the plates which certainly were published, agrees with the figure given in the substituted plate, which depicts both sexes, and which was drawn by Mrs. Peart, the motive of the author being to show the female as well as the male of the species in the plate he finally sent out to subscribers. A well executed figure is always to be preferred to a verbal description. Oberthür used to say: "Pas de bonne figure, pas de nom valable."

3. W. H. Edwards did change his description of the under side of the male of *A. nokomis* by substituting the words "golden yellow from base to margin" for "cinnamon brown mottled with buff, and having a green tinge next the abdominal margin," but both descriptions in the light of fact are seen to be infelicitous, and *neither of them at all describes A. nitocris*. *A. nitocris* absolutely is not a synonym of *A. nokomis*, Dr. Skinner to the contrary notwithstanding. Edwards had no specimen of what he called *A. nitocris* in his hands for eleven years after he had published his first description of *A. nokomis*, nor for two years after he had given to the world his final description and plates of this species.

3. The act of W. H. Edwards in redescribing and finely illustrating both sexes of what he considered to be the species which he had named *A. nokomis*, was a perfectly legitimate procedure and clarified the question as to the identity of the species. If I give a deed to a tract of land to a purchaser, and subsequently discover that in my description of the metes and bounds I have made an error, and then give to the purchaser a second supplementary deed, rectifying the imperfect description, any court of justice would recognize the validity, as well as the propriety, of my act. The case *in foro entomologico* is strictly analogous. The act of Edwards in redescribing and accurately figuring both sexes of his *A. nokomis* was to settle controversy. His Plate "Argynnis IV" in the supplementary part of the first volume of the Butterflies of North America to my mind is authoritative and

final, settling for all time what Edwards in the last analysis meant by the name *A. nokomis*. Subsequently in the U. S. Geographical Survey of the 100th Meridian, Vol. V, published by the U. S. Government Printing Office, 1875, Chap. VIII, p. 751, pl. XXXV, Edwards gives both the upper and lower sides of both sexes of *A. nokomis*, the male being darker on the upper side than as figured in 1872 in the "Butterflies of North America." Otherwise the two plates closely resemble each other. Strecker in Ruffner's Annual Report, Appendix SS, Government Printing Office, 1873, p. 1849, pl. I, figures the upper and lower side of what he calls "*A. nokomis* Edwards, ♀, aberr." He, however, made a misidentification. His plate represents the upper and lower side of *A. nitocris* Edw.

4. I maintain that the application of the new name *apacheana* by my friend, Dr. Skinner, to *A. nokomis* upon a surmise, quite imperfectly substantiated by the finding by him of some plates which Edwards had rejected because they had been wrongly colored, and by the discrepancies which have been pointed out between the first and the revised description by Edwards was a regrettable error.

5. *A. apacheana* Skinner is a pure synonym for *A. nokomis*, and I shall so treat it in my forthcoming book upon the butterflies of boreal America.

The bibliography and synonymy of the group, or complex, to which *A. nokomis* belongs, has been worked out by me as carefully as I have had time to undertake the task. It is herewith appended.

1. ARGYNNIS LETO Behr.

Argynnis leto Behr, Proc. Cal. Acad. Nat. Sci., II, 1862, p. 173; W. H. Edwards, Proc. Ent. Soc. Philada., III, 1864, p. 435; Butt. N. A., I, Pl. Argynnis X, 1869; Kirby, Syn. Cat. Lep., 1871, p. 157; Edwards, Butt. N. A., I, Argynnis Pl. X, 1872 (redrawn plate); Scudder, Bull. Buffalo Soc. Nat. Sci., II, 1875, p. 259; Edwards, Cat. Diurn. Lep. North of Mexico, Trans. Am. Ent. Soc., VI, 1877, p. 20; Revised Cat., *ibidem*, 1884, p. 268; List of Species of Diurn. Lep. North of Mexico, in Appendix to Butt. N. A., II, 1884, p. 3; Skinner, Ent. News, IV, 1893, p. 318 (Queries whether *leto* is not a western form of *A. cybele*); Syn. Cat. N. A. Rhopalocera, 1898, p. 5; Holland, Butterfly Book, 1898, p. 105, Pl. IX, figs. 5 and 6 (♂ and ♀); Dyar, List N. A. Lep., 1902, p. 13; Skinner, Trans. Am. Ent. Soc., XXIX, 1902, p. 36; Wright, Butt. West Coast, 1905, p. 130, Pl. XII, figs. 110, 110a, b, c, (♂ and ♀); Lehmann, in Seitz, Gross-Schmett. d. Erde, V, 1913, p. 407, Pl.

86a; Barnes & McDunnough, Check-list Lep. Bor. Am., 1917, p. 7.

Argynnis cybele, var. *leto* Strecker, Lep. Rhop. and Het., 1875, p. 106; Syn. Cat. Am. Macro-Lep. North of Mexico, Diurnes, 1878, p. 111.

Dryas leto Barnes & Benjamin, List Diurn. Lep. Bor. Am., 1926, p. 11.

VARIETAL FORMS.

Argynnis leto, var. *charlottii* Barnes, Canad. Ent., XXIX, 1897, p. 40; Strecker, Ent. News, VIII, 1897, p. 117 (maintains that var. *charlottii* is a synonym of *A. leto*); Skinner, Syn. Cat. N. A. Rhopal., 1898, p. 5; Cockerell, Univ. Colorado Studies, VII, 1910, p. 126; Barnes & McDunnough, Check-list, 1917, p. 7.

Dryas leto, var. *charlottii* Barnes & Benjamin, Check-list, 1926, p. 11.

Argynnis leto, ab. *letis* Wright, Butt. West Coast, 1905, p. 130, Pl. XII, fig. 111; Barnes & McDunnough, Check-list, 1917, p. 7.

Dryas leto, ab. *letis* Barnes & Benjamin, List Diurn. Lep. Bor. Am., 1926, p. 11.

2. ARGYNNIS NOKOMIS Edwards.

Argynnis nokomis Edwards, Proc. Acad. Nat. Sci. Philada., 1862, p. 221; Butt. N. A., I, *Argynnis* Pl. IV, 1868 (♂ type, drawn by D. Wiest); Kirby Syn. Cat., 1871, p. 157; Edwards, Butt. N. A., I, *Argynnis* Pl. IV, 1872 (♂ and ♀, redrawn plate); Synopsis N. A. Butt., 1872, p. 12; Edwards and Mead, Report Wheeler's Expedition, V, Zoölogy, Chap. VIII, 1875, p. 751, Pl. XXXV, ♂, ♀; Cat. Diurn. Lep. North of Mexico, Trans. Am. Ent. Soc., VI, 1877, p. 19; Strecker, Syn. Cat. Macro-Lep. N. A., Diurnes, 1878, p. 110; Edwards, Revised Cat., etc., Trans. Am. Ent. Soc., VI, 1884, p. 264; List of Species of Diurn. Lep. North of Mexico, Appendix to Butt. N. A., II, 1884, p. 3; Skinner, Syn. Cat. N. A. Rhop., 1898, p. 4; Holland, The Butterfly Book, 1898, p. 104, Pl. X, figs. 1, 2 (♂ and ♀); Dyar, List N. A. Lep., 1902, p. 13; Skinner, Trans. Am. Ent. Soc., XXIX, 1903, p. 36; Wright, Butt. West Coast, 1905, p. 129; Lehmann, in Seitz, Gross-Schnett. d. Erde, V, 1913, p. 407, Pl. 86a; Barnes & McDunnough, Check-list Lep. Bor. Am., 1917, p. 7.

A. cybele, var. *nokomis* Strecker, Lep. Rhop. and Het., 1875, p. 106.

A. apacheana Skinner, Ent. News, 1918, p. 67; Oberthür, Lépidoptérol. Comparée, Fasc. XXI, 1923, p. 160, Pl. DLXX, fig. 4911, ♂, 4912, ♀; Comstock, Butt. Cal., 1927, p. 81, Pl. 23, figs. 1-3 (♂, and ♀).

Dryas apacheana Barnes & Benjamin, List Diurn. Lep. Bor. Am., 1926, p. 11.

3. ARGYNNIS NITOCRIS Edwards.

Argynnis nitocris Edwards, Trans. Am. Ent. Soc., V, 1874, p. 15; Edwards & Mead, Report Wheeler's Expedition, V, Zoölogy, Chap. VIII, 1875, p. 751; Scudder, Bull. Buffalo Soc. Nat. Sci., II, 1875, p. 259; Edwards, Cat. Diurn. Lep. N. A. North of Mexico, Trans. Am. Ent. Soc., VI, 1876, p. 20; Strecker, Syn. Cat. Macro-Lep. N. A., Diurnes, 1878, p. 111; Edwards, Revised Cat. etc., *ibidem*, 1884, p. 268; Butt. N. A., III, *Argynnis*, Pl. I, 1887, (♂ and ♀, types); Skinner, Syn. Cat. N. A. Rhopal., 1898, p. 5; Holland, Butt. Book, 1898, p. 105, Pl. XIII, fig. 4, (♂ type); Dyar, List N. A. Lep., 1902, p. 13; Skinner, Trans. Am. Ent. Soc., XXIX, 1903, p. 36; Wright, Butt. West Coast, 1905, p. 129; Lehmann, in Seitz, Gross-Schmett. d. Erde, V, p. 407, Pl. 86a; Barnes & McDunnough, Check-list Lep. Bor. Am., 1917, p. 7; Skinner, Ent. News, XXIX, 1918, pp. 67-68 (*errore* sinks *nokomis* as synonym of *nitocris*); Winn, Ent. News, XXX, 1919, pp. 156-159; Skinner, *l.c.*, 1919, p. 159.

Argynnis nokomis ab. ♀, Strecker, Ruffner's Report, 1872, p. 1849, Pl. I, (Error in identification).

Dryas nokomis Barnes & Benjamin, List Diurn. Lep. Bor. Am., 1926, p. 11.

VARIETAL FORMS.

A. nitocris var. *nigrocærulea* W. P. Cockerell, Ent. News, XI, 1900, p. 622; W. P. Cockerell, Birds and Nature, XII, 1902, fig'd p. 83; Skinner, Trans. Am. Ent. Soc., XXIX, 1903, p. 36; Ent. News, XVIII, 1907, p. 318 (Early stages); Cockerell, Ent. Record, XXII, 1910, p. 72 (oviposition); Lehmann, (as *A. nitrocærulea*, err. typ.) in Seitz, Gross-Schmett. d. Erde, V, 1913, p. 408; Barnes & McDunnough, Contrib. to Nat. Hist. Lep. N. A., III, No. 2, 1916, p. 76 (maintain that *nigrocærulea* Ckll is "a direct synonym of *A. nitocris* Edw."). Paratypes received from Cockerell through Skinner and preserved in Holland Collection seem to confirm accuracy of this view. Barnes & McDunnough, Check-list, 1917, p. 7, (= *nitocris* Edw.)

Dryas nokomis var. *nigrocærulea* Barnes & Benjamin, List Diurn. Lep. Bor. Am., 1926, p. 11.

Argynnis nigrocærulea var. *rufescens* Cockerell, Ent. Record, 1909, p. 186; Lehmann, in Seitz, Gross-Schmett. d. Erde, V, 1913, p. 408.

4. ARGYNNIS CÆRULESCENS Holland.

Argynnis nitocris var. *cærulescens* Holland, Ent. News, XI, 1900, p. 332; Smith, J. B., Ent. News, XI, 1900, p. 449 (*A. cærulescens* a valid species, as shown by the genitalia); Skinner, *l.c.*, p. 483; Snyder, Occ. Mem. Chicago Ent. Soc., I, 1900, p. 33; Godman &

Salvin, Biol. Centr.-Amer., Rhop., II, 1901, p. 675, Pl. 112, figs. 15-18, ♂, ♀; Lehmann, in Seitz, Gross-Schmett. d. Erde, V, 1913, p. 408; Barnes & McDunnough, Cont. to Nat. Hist. N. A. Lep., III, No. 2, 1916, p. 74; Check-list Lep. Bor. Am., 1917, p. 11 (*cærulescens*, err. typ.).

Dryas nokomis var. *cærulescens* (sic) Barnes & Benjamin, List Diurn. Lep. Bor. Am., 1926, p. 11.

Note. I originally described this form as a variety of *A. nitocris* Edw. I am, however, constrained to raise it to specific rank, for though closely allied to *A. nitocris*, as species run in the genus, it is well entitled to such rank. It has nothing whatever to do with *A. nokomis*, as some hundreds of specimens, which have passed through my hands, clearly show.

NOTES ON THE DATES OF ISSUE AND THE CONTENTS OF THE SEVERAL PARTS OF VOL. I OF EDWARDS' BUTTERFLIES OF NORTH AMERICA.

As I have already intimated in the preceding pages, I am greatly indebted to Miss Ida R. Hood, the Acting Curator of Books and Publications in the American Museum of Natural History, for full information as to the copy of Vol. I of Edwards' Butterflies of North America preserved in the library of that institution. Not only are the original plates, which Edwards requested subscribers to cancel, preserved and bound in with the plates which he later issued, but the covers of all the parts, except the back-covers of parts 5 and 7, are also preserved.

VOLUME I. The "First Series" (Vol. I) of the work was originally issued by the American Entomological Society in ten Parts, to which a Supplementary Part was added. The title-page of the completed volume has been already given by me (See p. 15). The next title-page, after Hurd and Houghton had taken over the publication does not differ from the first, except that above the imprint of the American Entomological Society is the name of "Hurd and Houghton, Boston". A third printing of the title-page bears the following:

"NEW YORK

Published by Hurd and Houghton,
Cambridge; The Riverside Press.

1874."

In 1879 the entire text of Vol. I was reset and reprinted by "Houghton, Osgood and Company, Boston, The Riverside Press." In 1888 the title-page of Volume I bears the following at the foot of the page:

PHILADELPHIA
THE AMERICAN ENTOMOLOGICAL SOCIETY
1868—1872

Text Reprinted

BOSTON: HOUGHTON, MIFFLIN AND COMPANY
1888

In all of the issues by Hurd and Houghton and their successors the plates drawn by Wiest do not appear, but are replaced by the plates issued in the Supplementary Part in November, 1872, which were drawn by Mrs. Peart.

VOLUME II. The "Second Series" (Vol. II) reflects the changes which took place in the ownership of the Riverside Press. Parts I to VI of this volume bear the imprint of Hurd and Houghton; Parts VII to VIII bear the name of Houghton, Osgood and Company; and Parts IX to XIII were issued by Houghton, Mifflin and Company. Part XIII was issued in 1885.

VOLUME III. All the parts composing this volume were issued from the Riverside Press by Messrs. Houghton, Mifflin and Company. To this fact I can bear personal testimony, aside from that furnished by the covers of the Parts, as issued, and the title-page of the completed volume.

After the completion of Vol. II of his work W. H. Edwards, with whom I had corresponded a great deal, desired to proceed with the publication of a third volume, and so wrote me. At one time a man

of considerable wealth and the owner of large bodies of land in West Virginia, which he had inherited, his relations with the Chesapeake & Ohio Railroad, of which he was a Director, had led him into financial embarrassment. The circumstances of his embarrassment were most honorable to him, for his losses were sustained by him as a result of a valiant effort on the part of himself and his associates to keep the railroad property from bankruptcy. Had he succeeded, and thus retained possession of his inherited estate until later and more propitious times, he would have become one of the wealthiest men of his state, indeed of America. He told me of his desire to bring out the third volume of his work, and intimated to me that in order to do so he was about to propose to the Trustees of the British Museum the purchase of his collection, as they had not long before bought the collection of the moths of America made by A. R. Grote. Every American lepidopterist had come to realize the immense discomfort to which the sale of Grote's Collection had brought them. It is "a bit uncomfortable" for a student, who wishes to examine the "type" of a species, to have to make a journey from his home to Boston, New York, Washington, Pittsburgh, Chicago, or Los Angeles, but to have to make a trans-atlantic voyage is too much, whenever one is in doubt as to the name of a moth or a bug. Accordingly I wrote to Mr. Edwards and suggested to him that his great collection ought to be kept in the United States, and asked whether, if his terms were within my reach, he would not regard the cash coming from my pocket as useful as that of my British friends. The upshot of the matter was that he proposed to me, that, if I would pay the bills of the artist, Mrs. Peart, of the lithographers, the colorists, the printers, etc. etc., as they should become due, he would turn over his entire collection to me, and as "hand-money" immediately send me all his *Hesperiidæ*, the study of which he no longer intended to

pursue. So it came about that the Edwards Collection is in Pittsburgh, and that I have a sheaf of cancelled checks, many of them indorsed by Houghton, Mifflin and Company, attesting to my fidelity in carrying out my part of the contract.

THE DATES OF THE ISSUE OF THE PARTS OF VOLUME I, AND THEIR CONTENTS.

The issue of Vol. I gives the following:

- "Part 1.—April, 1868.—Containing *Argynnis Diana*, *A. Cybele*, *A. Aphrodite*, *A. Nokomis*, *A. Atlantis*.
- Part 2.—August, 1868.—Containing *Argynnis Callippe*, *A. Hesperis*, *Colias Alexandra*, *C. Chippewa*, (*Helena*), *C. Behrii*, *C. Christina*, *Apatura Alicia*.
- Part 3.—December, 1868.—Containing *Argynnis Monticola*, *A. Halcyone*, *Limenitis Proserpina*, *Lycæna Violacea*, *L. Lygdamus*, *Thecla Læta*, *T. Acadica*.
- Part 4.—April, 1869.—Containing *Argynnis Leto*, *Colias Eurytheme*, *C. Keewaydin*, *Limenitis Weidemeyerii*, *Thecla Ontario*, *T. Strigosa*.
- Part 5.—December, 1869.—Containing *Argynnis Edwardsii*, *Colias Eurydice*, *Limenitis Lorquini*, *Grapta Faunus*, *Lycæna Pseudargiolus*, *L. Neglecta*.
- Part 6.—June, 1870.—Containing *Argynnis Behrensii*, *A. Zerene*, *Colias Edwardsii*, *Anthocaris Reakirtii*, *A. Cooperii*, *Limenitis Californica* (*Bredowii*.)
- Part 7.—January, 1871.—Containing *Parnassius Clarius*, *P. Clodius*, *Colias Occidentalis*, *Anthocaris Sara*, *Melitæa Chalcedon*, *Paphia Glycerium*.
- Part. 8.—August, 1871.—Containing *Neophasia Menapia*, *Pieris Beckerii*, *P. Virginiensis*, *P. Vernalis*, *Argynnis Nevadaensis*, *Grapta Comma*, *G. Dryas*.
- Part 9.—December, 1871.—Containing *Papilio Ajax*, var. *Walshii*, var. *Telamonides*, var. *Marcellus*, *Grapta Interrogationis*, var. *Umbrosa*, var. *Fabricii*.
- Part 10.—July, 1872.—Containing *Parnassius Smintheus*, *P. Evermanni*, *Grapta Satyrus*, *G. Zephyrus*, *Colias Meadii*, *C. Scudderii*."

There is no mention in the original issue of Vol. I of the Supplementary Part. This bore on the front cover-page of the wrapper the following:

SEE NOTICE ON LAST PAGE OF COVER
Supplementary Part. (Concluding the Volume).

THE
BUTTERFLIES OF NORTH AMERICA

BY

W. H. EDWARDS

Member of the American Entomological Society

PHILADELPHIA

The American Entomological Society.

1872

The issue of the "Supplementary Part" is first noted in the First Volume as printed by Hurd and Houghton. It actually was distributed to subscribers in November, 1872, but in the volume as printed by Hurd and Houghton, it is cited as follows: "SUPPLEMENT.—January, 1873.—Containing new Plates of *Argynnis Diana*, *A. Nokomis*, *A. Leto*. Supplementary Notes. Index. Synopsis."

- The notice referred to on the front cover-page of the wrapper of the Supplementary Part (See *antea*) appears on its last page and reads as follows:

"NOTICE

Volume I. of the BUTTERFLIES OF NORTH AMERICA will shortly be published by Messrs. Hurd & Houghton, of New York. Part 2* of Volume II. will issue from same house about June 1st, 1873,† and to insure regularity of delivery (quarterly) the several Parts will contain but three or four Plates, the price per Part being at the rate of 50 cents per Plate.

Subscriptions to Volume II. will be received by Hurd & Houghton, New York, or E. T. Cresson, Post Office Box 31, Philadelphia. That some idea may be formed of the size of the edition required, it is desirable that subscriber's names should be sent in early, the subscription money will not be payable until the Parts are ready for delivery.

The general style of the work will be as heretofore, but the Plates and descriptions will not be limited strictly to hitherto unfigured species.

W. H. EDWARDS.

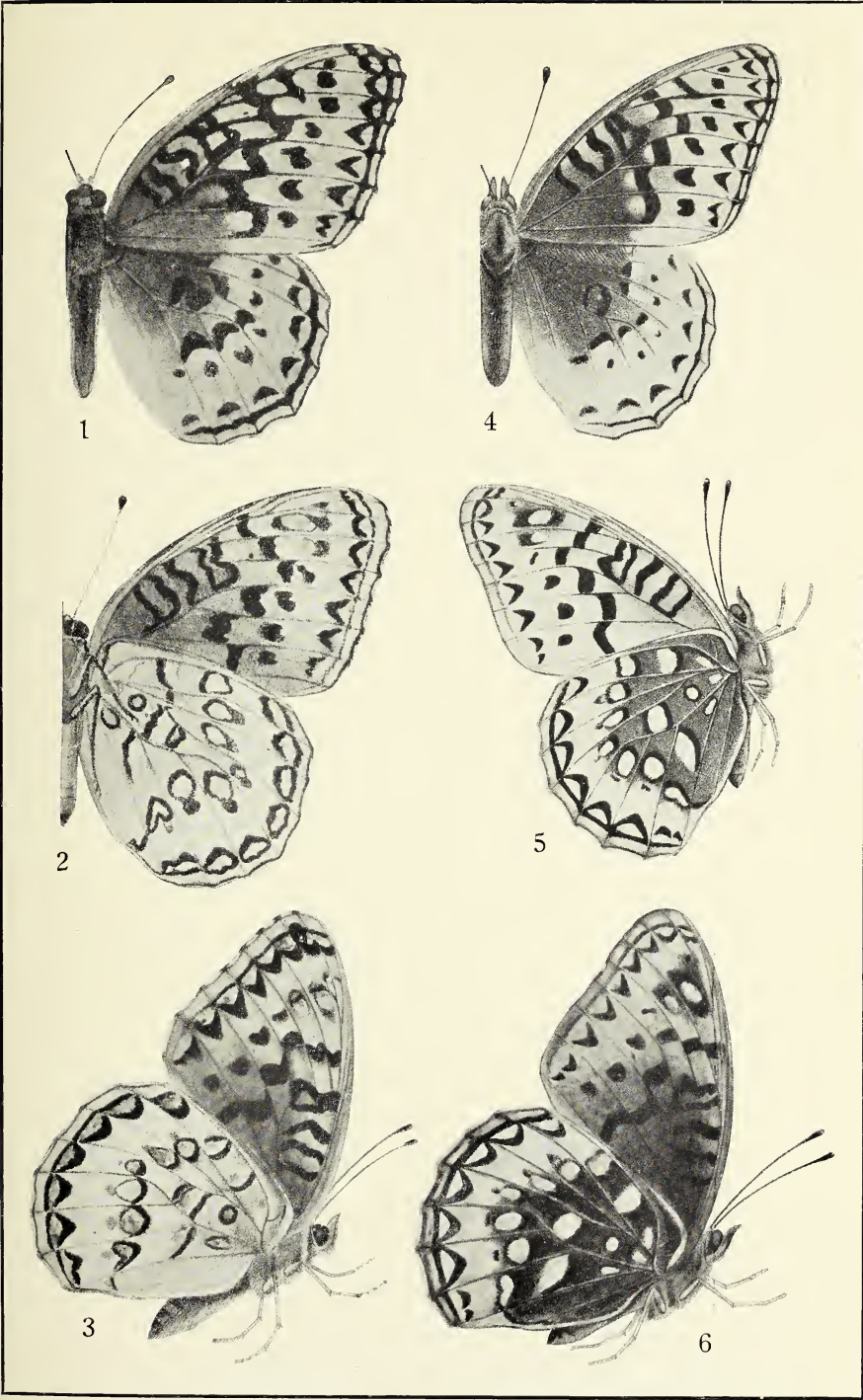
November, 1872."

*Corrected in ink from "2" to 1.

†Did not, however, appear until May, 1874.

EXPLANATION OF PLATE II.

- Fig. 1. Photograph of the upper side of the fore wing of the type of *A. nokomis* Edw. ♂, from the colored plate executed by D. Wiest contained in the copy of "The Butterflies of North America," originally owned by R. L. Walker and now in the possession of Dr. A. Avinoff. This is one of the original plates issued to an early subscriber in the year 1868, and which was replaced by another plate drawn and colored by Mrs. Mary Peart, and sent gratis to subscribers in the Supplementary Part of Vol. I, issued by the American Entomological Society in November, 1872.
- Fig. 2. Photograph of the under side of the hind wing of the type of *A. nokomis* as shown in Wiest's plate found in the same copy as Fig. 1.
- Fig. 3. Photograph of the under side of the hind wing of *A. nokomis* as delineated by Mrs. Peart in the substituted plate issued in November, 1872. It will be observed that there is no appreciable difference between this representation and that shown in Fig. 2. (Slightly enlarged by the photographer).
- Fig. 4. Upper side of the fore wing of the type of *A. nitocris* Edw. ♂, as delineated by Mrs. Peart in the Third Volume of "The Butterflies of North America."
- Fig. 5. The under side of the wings of *A. nitocris*, ♂, from an uncolored copy of the drawing of that species executed by Mrs. Mary Peart.
- Fig. 6. Photograph of the same after having been colored. (Slightly enlarged by the photographer).



For explanation see opposite page.

III. NOTES UPON SOME NORTH AMERICAN SPECIES AND VARIETIES OF THE GENUS *BRENTHIS*.

BY W. J. HOLLAND.

(One figure in text)

Being engaged in the study of the butterflies of North America preparatory to the issue of a new and revised edition of "The Butterfly Book," I am led after going over the species of the genus *Brenthis* to publish the following notes as preliminary to figuring some of the forms herein described.

1. *B. myrina* (Cram.)

Papilio myrina CRAMER, *Papillons*, Exot., I, 1779, p. 141, Pl. 189, figs. B, C; HOLLAND, "Butterfly Book," 1898, Pl. XV, fig. 1 ♂; fig. 2, ♀, *underside*; Do. "Butterfly Guide," 1915, Pl. XVII, fig. 1, ♂; fig. 2, ♀, *underside*.

The locality given by Cramer in his original description is New York: "Men heftze in Noord-Amerika by Nieuw-jork gevangen." I possess a series of specimens in the collections of W. H. Edwards and Theodore L. Mead taken by these gentlemen at Hunters, N. Y.; others taken by myself at Saratoga, and various localities in New England, and many from Pennsylvania. All of these agree with the somewhat crude figure given by Cramer and the specimens from New York may be accepted as topotypical. The male figure in "The Butterfly Book" is a specimen from Hunters, New York, from the Edwards Collection; the female, which shows the underside, is a specimen from the same locality selected from the Mead Collection. The male figured in "The Butterfly Guide" is a specimen bred by W. H. Edwards at Coalburgh, W. Va.; the female is the same specimen shown in "The Butterfly Book," reversed upon the pin to accommodate the specimen to the requirements of the plate. In "The Butterfly Guide" the figures are reduced about one-fourth below natural size. In all of these specimens the discal and basal markings of the wings on the upper side are not as heavy as in Cramer's original drawing and more nearly represent the "general run" of specimens of this species in New England and the Middle States. Occasionally specimens, marked as heavily as shown on Cramer's plate, are found. I have a couple of such specimens from Hunters, N. Y., and from the

summit of the Allegheny Mountains near Cresson, Pa. The late Dr. Henry Skinner in the Trans. Am. Ent. Soc., Vol. XIV, 1887, p. v, calls attention to a pair of abnormal specimens, in which the discal and basal spots are widely black, apparently much more so than in Cramer's figure.

a. *B. myrina jenningsæ*, ♂, ab. nov.

The tendency to the enlargement of the transverse markings of the wings, which is found in all of the species of the group to which the insect belongs, is strikingly shown in an aberrational form taken by Mrs. O. E. Jennings at Jellicoe, on Thunder Bay, Ontario. The specimen is in the Carnegie Museum, Acc. No. 5921. To this aberration I give the name *jenningsæ*. A brief description follows:

♂. *Upper side*: fore wing, the two spots nearest the base of the wing in the cell are enlarged and fused, forming a large quadrate spot; both of the spots in the cell beyond these are greatly enlarged; the triangular spot near the base between veins 1 and 2 is greatly enlarged, and developed into a black triangle pointing outwardly; the discal band of dark spots are greatly enlarged, forming an irregular band from the costa to the inner margin; the marginal and submarginal series of spots are also enlarged. On the hind wing all of the spots and bands are greatly enlarged and black. *Under side*: the same increase in the size of all the markings which is seen on the upper side of the wings is repeated on the under side. The general ground-color of the wings is not as bright rufous as is ordinarily the case, but tends to buff.

b. *B. myrina terræ-novæ* subsp. nov. In the collection of Theodore L. Mead is a series of male specimens taken by him in Newfoundland. These are all characterized by the suffusion of the inner half of both fore and hind wings by fuscous, so that the markings on the wings are obscured. To this form I give the subspecific name *terræ-novæ*. It is the insular form of *B. myrina* which is commonly found in Newfoundland.

c. *B. myrina nebraskensis*, var. nov. For many years I have had in my possession four specimens, unfortunately all of them males, collected for me in Dodge County, Nebraska, by Mr. E. A. Dodge. They are remarkable because of their large size, exceeding in expanse of wing the ordinary run of topotypical specimens by fully 25 pr. ct. The usual expanse of males is as shown in "The Butterfly Book, Pl.

XV, fig. 1," about one and one-half inches. These specimens are all about two inches in expanse of wing, one of them exceeding two inches in expanse. For this large variety I propose the name *nebraskensis*.

d. *B. myrina tollandensis* Barnes & Benjamin.

Of this western form I find that I have two specimens in the Mead Collection, labelled as from "The Middle Park, Colorado." Mead listed them as *Argynnis myrina* in his "Report upon the Collections of Diurnal Lepidoptera, &c., U. S. Geog. & Geol. Survey West of the rooth Meridian," Vol. V, Cap. VIII, 1875, p. 756. *B. myrina tollandensis*, B. & Benj., as pointed out by the authors, is prevalently lighter in color than topotypical specimens with a tendency to a reduction in size of the dark markings. We have a specimen from Montana which shows the same characteristics, but it is larger than the specimens from Colorado, which do not exceed in size the average run of eastern specimens.

2. *B. euphrosyne* (Linnæus) var. *andersoni* Dyar.

Barnes & Benjamin in their recent *Check-list of the Butterflies of Boreal America* treat *B. andersoni* Dyar as a form of *B. euphrosyne* (Linnæus). With a long series of *B. euphrosyne* and of the smaller northern variety, *B. fingal* Herbst before me, most of the specimens obtained by me from the late Dr. Otto Staudinger, and therefore probably correctly determined, I am inclined to agree with Barnes and Benjamin in their view. The description given by Dyar agrees well with the underside of the specimens of *B. euphrosyne*, which I have carefully examined, but on the upper side the description of Dyar does not exactly agree with what is known of *B. euphrosyne* and its varieties from Europe. The latter are all quite dark on the inner third of the wings, especially the hind wing. The form described by Dyar is brighter, and the markings more distinct.

3. *B. laurenti* Skinner.

Barnes and McDunnough sink this as a synonym of *B. andersoni* Dyar. I have recently examined the type of *B. laurenti* Skinner and am not at all prepared to regard it as being the same as *B. andersoni*, but reserve expressing a final opinion until I can more closely compare the types.

4. *B. kriemhild* Strecker. We have in our possession in the collection of the late George Ehrman a pair labeled "*B. kriemhild* Strecker,"

which according to the labels were received from Strecker. They are marked "cotypes," "Coll. Strecker," and bear the locality label *Utah*. Dr. Skinner (The Entomological News, Vol. XXV, p. 324) says: "It is evident that the female from Utah, which he [Strecker] names in his catalog either has been lost or the sex of the specimen was wrongly determined." Strecker occasionally sold specimens which were portions of the suite which he had before him when he described the species. This is well known. It is possible that the female, which Skinner speaks of as having been "lost," may be the female now in the Ehrman Collection, but I question the accuracy of Ehrman's label. His correspondence was destroyed before his death and I have no clue by which to unravel the matter. The specimens do not fully agree with the types in Chicago.

However all this may be, we have made a comparison of photographs of Strecker's types with a long series of *B. euphrosyne* from Europe, and they reveal no significant differences, except that on the underside of both the fore- and the hind wings the dark marginal and submarginal markings appear to be obsolescent or entirely lost. I am inclined therefore to think that *kriemhild* should be placed with *andersoni* as a form of *B. euphrosyne*. The synonymy would then be as follows:

B. euphrosyne (Linnaeus)

a. var. *kriemhild* Strecker.

b. var. *andersoni* Dyar.

B. kriemhild Strecker has nothing whatever to do with *B. epithore* with which Strecker in his original description compared it, and under which it was originally placed as a variety by Skinner in his Synonymic Catalogue, following Edwards' Revised Catalogue of Diurn. Lep. &c., 1884, p. 273. It does not belong in the same group with *epithore*.

5. *B. triclaris* (Hübner).

Argynnis triclaris HÜBNER, Exot. Schmett., Bd. II, Tafl. 232 (19), figs. 1-4; *B. triclaris*, var. *alticola* B. & McD., HOLLAND, Butterfly Book, Pl. XV, fig. 3, ♂.

a. *B. triclaris* undoubtedly first came into the hands of Hübner through the Moravian missionaries who were settled in Labrador before the middle of the Eighteenth Century, some of whom, as is known to the writer, collected extensively and sent their collections to Germany for study. At a later date Möeschler received a great many insects from Labrador from the Moravian missionaries, as I also did at still later dates. The figure given by Hübner I take to be

the figure of a specimen from Labrador. We have in our collections numerous specimens from the eastern coast of Labrador and from western Labrador, that is the eastern shore of Hudson Bay. All these agree well with Hübner's figure. The form found in Labrador is, as has already been pointed out by Barnes and MacDunnough, the typical form of *B. tricularis*. The specimens show considerable variation in the intensity of the silvery markings on the under side, but they are all strongly pronounced, even if they do not always show silvery lustre and are sometimes matt.

When I made up the plates for *The Butterfly Book*, I selected a finely preserved specimen contained in the collection of Theodore L. Mead, which is in my possession, and figured it on the plate above cited. This form, of which we have a long series, collected by Mead in Colorado, and others collected in Albany County, Wyoming, and elsewhere upon the eastern slopes of the Rocky Mountains, was in 1913 named *B. tricularis alticola* by Barnes and MacDunnough (Contrib. Lep. N. Am., II, p. 98). Therefore the figure in "The Butterfly Book" is a figure of the varietal form, to which Barnes and MacDunnough gave the above name. It is, as is pointed out by them, characterized by its lighter ground-color, the reduction of the apical and basal dark shading, and by the narrower and more cleanly cut black markings, while the ground-color on the under side is deep cinnamon-brown. We have recently received at the Carnegie Museum a fine set of eleven specimens of *B. tricularis alticola* taken at Dawson, Yukon Territory, by Mr. J. A. Kusche.

b. Another varietal form has been named *B. myrina dawsoni* by Barnes and MacDunnough (Canad. Entom. XLVIII, 1916, p. 222). Of this form we possess a specimen from Silver Islet near the eastern end of Lake Superior and others from Longue Lac, which is east of Lake Nipigon. They were collected by Mrs. Otto E. Jennings, who accompanied her husband on his botanical exploration to that part of western Ontario. It is, however, worthy of note that some of the specimens collected at Longue Lac are lighter, and agree more nearly with specimens from Labrador, of which the writer has in his collection fifty-one specimens and of which the Carnegie Museum also possesses a long series taken in Alaska and on the western side of the Labrador peninsula by various exploring expeditions sent out by the Carnegie Museum. *B. myrina dawsoni*, B. & McD., can hardly be

regarded as a local race, but is a melanic form, which turns up in various parts of the area in which *B. tricoloris* occurs.

6. *B. albequina* sp. nov. Near *B. selene* (Denis & Schiffermüller).

♂. *Upperside*: the ground-color of the wings is prevalently a deeper shade of reddish fulvous than is the case in *B. myrina* (Cramer), which at first glance the species superficially resembles. The reddish marginal lunules which are conspicuous in *B. selene* (D. & S.), and in *B. myrina* (Cram.) are only obscurely represented in some specimens, or wholly wanting in others; the marginal border in consequence being broadly black. The forewing at the base of the cell and below the cell from the mesial band of transverse spots inwardly, as well as almost the entire inner half of the hind wing is deeply clouded with dark fuscous, so that the spots and markings toward the base are obscured, much more than is the case in *B. selene* or typical *B. myrina*, with long series of specimens of which comparison has been made. The only specimens of any form of *B. myrina* which I have seen, which show analogous obscuration at the base of the wings, are the specimens from Newfoundland, to which I have given the varietal name *terra-novæ*, but between the upper and under surfaces of *B. myrina terra-novæ* and *B. albequina* there are such obvious differences that at a glance it is seen that they are not identical. *Under side*: the fore wings on the under side very closely agree in the location, form, and size of the dark markings with specimens of *B. selene* from Great Britain and Central Europe, which are before me, but the ground-color toward the apex is paler, passing into pale buff, which is not the case in *B. selene*, nor in *B. myrina*. In the latter species the ground-color often is paler toward the apex of the fore wings on the under side, but the paler area is only a lighter shade of the prevalent bright fulvous, while in *B. albequina* the transition is to a dull grayish buff. The marginal lunules of the fore wing are bright silvery, as in *B. myrina*, while in *B. selene* and its variety *hela* Stgr. they are whitish yellow with little or no silvery lustre. The dark cinnamon-red apical blotch, which is characteristic of typical *B. myrina*, is reduced to a pale gray shade, as is the case in *B. selene* and its variety *hela* from Lapland. In the variety *hela* it almost entirely disappears, as is the case in several of the specimens of *B. albequina* before me. In none of them is it conspicuous as in *B. myrina*. The hind wing agrees closely in its markings with *B. selene*. Between *B. selene* (D. & S.) and *B. myrina* (Cram.) there is a notable difference in that

the submedian band of small silvery spots, which is continuous in *B. myrina* as a curved series from the costa to the inner angle of the wing, in *B. selene* and its variety *hela* is interrupted about the middle of the wing, no silvery spots being found in the interspaces between veins 4 and 5, and in many individuals between veins 3 and 5. The same is true of *B. albequina*. Only in one specimen of the seven males before me can a faint trace of a silvery spot be found at the point indicated. The dark cinnamon blotches which are located in *B. myrina* at the upper and inner angles of the hind wing and which are also sometimes found in *B. selene*, but never in its variety *hela*, are not shown in *B. albequina*, and in this respect the specimens before me agree closely with specimens of *hela* Stgr. sent me by Staudinger many years ago. The underside of the only female of *B. albequina* I have almost exactly repeats in this respect the markings of the female specimen of *hela* Stgr., which is before me.

A noticeable feature of the maculation of the hind wing on the underside of *B. albequina* is the tendency of the silvery spot of the median band which lies just below the cell between veins 1 and 2 to become subdivided, the inner half of the spot being often greatly reduced in size, or even entirely obliterated being replaced by a black dot.

The form of this spot in *B. selene*, its variety *hela*, and in *B. myrina*,

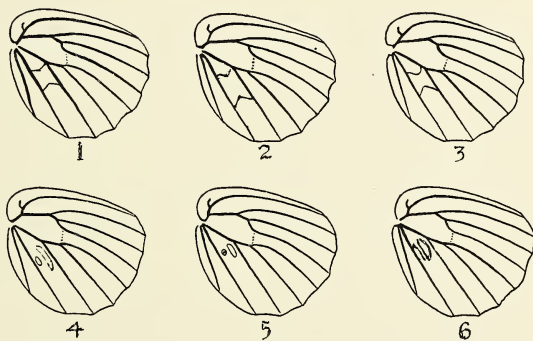


Fig. 1. Neuration of the hind wings of *B. myrina*, *B. selene*, *B. hela*, and *B. albequina*, sp. nov., showing the form of the silvery marking on the underside of the hind wing in these forms, between the submedian and the lower median veins near the base of the wing.

1. *B. myrina*; 2. *B. selene*; 3. *B. hela*; 4. *B. albequina*, ♂; 5. *B. albequina*, ♂; 6. *B. albequina*, ♀.

is shown in fig. 1 and its form in several specimens of *B. albequina* is also given. The form of this spot furnishes a good diacritical mark whereby to distinguish *B. albequina* from allied species.

♀. The only female in my possession suggests that it may be an aberrational form. In case it should prove to be such, I suggest for it the name *albequina*, var *baxteri*, inasmuch as she, with the seven males, were all taken on White Horse Pass by my correspondent, Mr. W. F. O. Baxter.

Upper side: the specimen has a lighter ground-color than the males, being tawny, rather than deep reddish. The dark basal and median markings are apparently much enlarged, and run into each other, except that about the middle of the cell there is a lighter area on which the second spot from the base stands forth conspicuously. The area surrounding this light spot is almost solidly dark brown with the normal markings obscurely revealed as deeply black spots. The outer half of the wing is traversed by a regular series of sub-marginal spots and in this sex the outer black border of the wing has pale triangular spots on the interspaces, followed inwardly by blackish sagittate markings. The inner half of the hind wing corresponds in color with the fore-wing, being tawny with the spots black. As in the middle spot of the cell of the fore-wing, the black spot in the middle of the cell of the hind wing is accentuated, by being surrounded by a pale incomplete circle of the ground-color. The outer half of the hind wing corresponds in color to the same area of the fore wing and has a complete series of rather large and sharply defined submarginal spots. The outer margin is marked precisely as is the outer margin of the fore wing. *Under side:* the wings agree with the wings of the males already described, but the ground-color is paler inclining at the apex of the fore wing and throughout the hind wing to purplish gray. The spots of the fore wing are dark and well defined, the two spots located between veins 1 and 2 below the cell being fused and forming an oblong and deep black spot as is also the case in two of the males. The silvery markings on the hind wing consist of four small spots immediately at the base, a quadrate spot near the costa above the cell incised at either end and narrowly defined by black; a moderately large obovate spot over the end of the cell, narrower and pointing outwardly; the spot between veins 1 and 2 below the cell divided, and composed of two narrow silvery streaks outlined by dark brown; the band of silvery spots succeeding the median band is well interrupted

beyond the cell; the submarginal black spots are fairly large and well defined; the silvery marginal spots are triangular in form, surmounted inwardly by deep black sagittate markings. The light area between veins 3 and 5 is pale purplish gray.

Expanse of males, 32—35 mm.; of female, 41 mm.

The foregoing description is based upon eight specimens, seven males and one female, collected at White Horse Pass, Yukon Territory, by Mr. W. F. O. Baxter. Type, ♂, ♀ allotype, and six ♂ paratypes in Holland Collection.

7. *B. polaris* (Boisduval).

With a good series of *B. polaris* Bdv. before me from various European localities, and a long series from Labrador, I can find no essential difference between the insects from Europe and the eastern portions of the North American Continent. But there is a quite marked and apparently consistent difference between the specimens from Alaska and those from Europe and Labrador. The former are much lighter on the upper surface with the spots and dark basal suffusion of both wings much reduced giving the upper surface a much brighter appearance than is the case in the latter. On the underside there is also a tendency to a lighter coloration and to an enlargement of the silvery spots. This is especially true of specimens from the Yukon region, in which the ground-color of the basal area is not deep maroon as in specimens from Europe and Labrador, but lighter red. This appearance seems to be constant. This form I take to be that which Strand has described as *B. polaris* var. *americana*.

8. *B. improba* (Butler).

This species has been by some writers treated as a varietal form of *B. frigga*. Bryck (Ent. Tidskrift, XLI, 1920, pp. 129-132) has discussed the matter in the light of a male specimen received by him from O. Bang-Haas labelled *Argynnis improba*. Bryck figures the upper and under side of this specimen. Unfortunately it is *not* a specimen of *B. improba* Butler, but a male specimen of *B. frigga* like dozens of others I have from various parts of the northern regions of America. Dr. Bryck's figures 2 and 5, p. 130 delineating a specimen from Torneträsk, Sweden, represents more nearly what we know as *B. improba* Butler, and the insect is different from what he gives in his figs. 1 and 4 as *improba* Butler from North America. The two are not identical.

Gibson (Canadian Arctic Expedition, III, 1922, Part I, Lepidoptera, Pl. V, figs 7 and 8) has given us recognizable figures of the upper side of the male and female of *B. improba*. On the underside the markings are recognizably different from those of *B. frigga*. As species run in this genus, *Brenthis improba* Butler is worthy of being specifically separated from other forms. It ranges nearer the Arctic Circle, than any other nymphalid butterfly, and has been received from Nova Zemlya.

9. *B. youngi* Holland.

This has been sunk as a synonym of *B. improba* by Barnes and Benjamin in their lately published "List of the Diurnal Lepidoptera of Boreal America." As I think that neither of my valued friends has seen the type, which unfortunately remains unique in my collection, I am somewhat puzzled at their conclusion. On the upper side the ground-color is bright fulvous on the outer half of both fore and hind wings and not obscurely dark brownish as in *B. improba* Butl. The dark submarginal and marginal markings stand out in sharp contrast with the light ground-color. On the underside the wings are very pale, the markings very faint, except on the hind wing, where a deep brown narrow curved band of maroon runs from the costa to the middle of the inner margin. It certainly does not agree with any specimen of *B. improba* I have seen.

10. *B. frigga* var. *lehmanni*, nom. nov.

B. frigga alaskensis Lehmann, Gross-Schmett. d. Erde, V, 1913, pl. 86a.

The female type of this species is named and figured by Lehmann in Seitz, Gross-Schmett. d. Erde, V, 1913, p. 424, pl. 86a. Unfortunately *alaskensis* as a subvarietal name is pre-occupied in the genus (Cf. *A. pales* var. *alaskensis* Holl., 1900), and I therefore propose the new name *lehmanni*. I possess fine series of both males and females of this well marked form from the Kuskokwin River and various other parts of Alaska. I propose to figure both sexes in the near future.

11. *B. bellona* (Fabricius).

This well known insect varies greatly in its appearance over its range. From the interior of Labrador we have received a good series of specimens showing the melanic tendency which is so marked in the butterflies of the subarctic and arctic regions in eastern America. I propose to name them in honor of Mr. W. E. Clyde Todd, who brought them with him, when he and his associates made the first crossing of

Labrador achieved by white men, from Three Rivers, Quebec, to Ungava on Davis Strait. The description follows:

a. *B. bellona* subsp. *toddi*, subsp. nov.

Upperside: all of the specimens, male and female, are characterized by the fact that both the fore and hind wings, with the exception of the outer submarginal band, are heavily suffused with dark brown, so that the maculation apparent in typical *B. bellona* is almost lost to the eye; furthermore the marginal spots and those of the next inner row are confluent and thus present the appearance of a heavy dark brown outer border. The fore wings are more suffused with dark color than the hind wings and in one specimen the fore wing is almost solidly dark brown or blackish. *Underside*: on this side the wings are deeper in color than in the southern races of *A. bellona*, though the maculations are well preserved in outline and do not show the tendency to fuse and coalesce, which is shown on the upper side. Type ♂, St. Margaret's River, July 5, 1917, C. M. Acc. No. 5968, Todd coll.; allo-type ♀, East Main, July 8, 1914, C. M. Acc. No. 5269, Todd coll.; four male paratypes from St. Margaret's and Moisie Rivers, Quebec.

Melanism often sporadically reveals itself in this species, and we have numerous examples of both sexes in which this phenomenon presents itself. A large series from the region of Lake Nipigon, Ontario, reveals this tendency, but without any coalescence of the marginal markings. The outer edge in these specimens is always bright fulvous except for the marginal and submarginal dots. In eastern Quebec, the interior of Labrador and on the eastern side of Hudson Bay, this dark form seems to constitute a well marked and constant race. I hope shortly to publish colored figures of the types, which are above described.

b. *B. bellona*, ab. *pardopsis* ab. nov.

A rather remarkable aberrant form of *B. bellona* taken at Crafton, Allegheny County, Pa., is before me. It was captured on Aug. 27, 1921. It is a female. *Upperside*: pale tawny, shading into darker fulvous toward the base of both wings. The usual markings appear, but all are greatly reduced in size and more or less disconnected and not confluent, thus imparting to the wings a spotted appearance. It has been suggested on this account that the insect should bear the varietal name *pardopsis*, which appears appropriate. The color and the spots suggest the pelt of a leopard. On the underside the markings are those of a normal specimen of *B. bellona* in this latitude.

ARTICLE IV.
ANNALS CARNEGIE MUSEUM
Vol. XIX, September, 1928*

II.
LIST OF TYPES OF FISHES
IN THE COLLECTION OF THE
CARNEGIE MUSEUM
on September 1, 1928

*The student will observe that the pagination in the following article is double. The first numeral indicates the regular pagination in the volume of the ANNALS in which the list originally appeared; the second numeral in parentheses is the pagination to be employed when these lists shall ultimately be gathered together and bound in a separate volume.

INTRODUCTORY.

The article here published is the second of those giving lists of the types of animals preserved in the collections of the Carnegie Museum. It enumerates in systematic order the fishes which various authors have named and described, the types of which are contained in the Section of Fishes. There are over five hundred such types. They represent only a small part of the great Collection of Fishes in the Museum, but their value to students of science is very great. They are mainly from South America and from the waters of the western Pacific. Systematic students of the fishes of South America, Hawaii, Formosa, Japan, and Korea will find in them the means of settling questions which in the future may arise as to the identity of species. To Mr. A. W. Henn, the Compiler of the List, great credit is due for his painstaking accuracy and patient arrangement of the citations of the original descriptions.

W. J. HOLLAND.

September 1, 1928.

IV. LIST OF TYPES OF RECENT FISHES, IN THE
COLLECTION OF THE CARNEGIE MUSEUM
ON SEPTEMBER 1, 1928.

BY ARTHUR W. HENN.

Class **ELASMOBRANCHII.**

SUBCLASS SELACHII.

Order **EUSELACHII.**

Family SCYLLIORHINIDÆ.

Pristiurus sauteri Jordan and Richardson, Memoirs Carnegie Museum, IV, 1909, p. 160.

Type, No. 219; Takao, Formosa; Hans Sauter.

Order **TECTOSPONDYLI.**

Family SCYMNORHINIDÆ.

Squaliolus sarmenti Noronha, Annals Carnegie Museum, XVI, 1926, 385.

Type, No. 7976, female, 246 mm., Funchal, Madeira Islands; Noronha.

Order **BATOIDEI.**

Family RAJIDÆ.

Raja hollandi Jordan and Richardson, Memoirs Carnegie Museum, IV, 1909, 163.

Type, No. 224, female, disk 8.25 inches; Takao, Formosa; Hans Sauter.

Family DASYATIDÆ.

Dasyatis ushieii Jordan and Hubbs, Memoirs Carnegie Museum, X, 1925, 114.

Type No. 7778, male, 988 mm. to tip of tail; Mikawa Bay, Japan; Ishikawa.

SUBCLASS HOLOCEPHALI.

Order **CHIMÆROIDEI.**

Family CHIMÆRIDÆ.

Psychichthys eidolon Jordan and Hubbs, Memoirs Carnegie Museum, X, 1925, 117.

Type, No. 7779, female, 1285 mm., off Mishima, Izu, in Sagami Bay, Japan.

Class PISCES.

SUBCLASS ACTINOPTERI.

SUPERORDER TELEOSTEI.

(The Bony Fishes).

Order ISOSPONDYLI.

(The Soft-rayed fishes).

Family ALBULIDÆ.

Albula virgata Jordan and Jordan, Memoirs Carnegie Museum, X,
1922, 6.

Type, No. 3896, 15.75 inches, Honolulu, Hawaii; Jordan or
Grinnell.

Family CLUPEIDÆ.

Rhinosardinia serrata Eigenmann, Memoirs Carnegie Museum, V,
1912, 445.

Type, No. 2443, 85 mm.; Morawhanna, British Guiana;
Eigenmann.

Family ENGRAULIDÆ.

Stolephorus branchiomelas Eigenmann, Proc. Amer. Philos. Soc.
LVI, 1917, 682.

Type, No. 7491, 68 mm.; mouth of Rio Dagua, Colombia;
Eigenmann.

Stolephorus guianensis Eigenmann, Memoirs Carnegie Museum, V,
1912, 447.

Type, No. 2448, 38 mm.; Bartica, British Guiana; Eigen-
mann.

Family ALEPOCEPHALIDÆ.

Alepocephalus umbriceps Jordan and Thompson, Memoirs Carnegie
Museum, VI, 1914, 209.

Type, No. 6030, 270 mm.; Aomori, Japan; Jordan.

Family SALMONIDÆ.

Oncorhynchus adonis Jordan and McGregor, Memoirs Carnegie Mu-
seum, X, 1925, 127.

Type, No. 7784, male, 12.94 inches, Lake Hakone, Sagami,
Japan; D. S. Jordan.

Oncorhynchus ishikawæ Jordan and McGregor, Memoirs Carnegie
Museum, X, 1925, 132.

Type, No. 7786, male, 7 inches; Lake Biwa, Japan; Wakiya.

Oncorhynchus kawamurae Jordan and McGregor, Memoirs Carnegie Museum, X, 1925, 128.

Type, No. 7785, Lake Toyama, Ugo, Japan; Prof. T. Kawamura.

Oncorhynchus rhodurus Jordan and McGregor, Memoirs Carnegie Museum, X, 1925, 137.

Type, No. 7794, male, 20.25 inches, Lake Hakone, Sagami, Japan; Jordan.

Salvelinus imbrius Jordan and McGregor, Memoirs Carnegie Museum, X, 1925, 142.

Type, No. 7797, female, 9.25 inches, near Hamada, Iwami, Japan; Ishikawa.

Salvelinus timagamiensis Henn and Rinkenbach, Annals Carnegie Museum, XVI, 1925, 131.

Type, No. 7969, 10.75 inches, White Pine Lake, Gamble Township, Timagami Forest Reserve, Ontario, Canada; Collectors, Henn and Rinkenbach.

Family OSMERIDÆ.

Spirinchus verecundus Jordan and Metz, Memoirs Carnegie Museum, VI, 1913, 11.

Type, No. 4570, 5.75 inches, Chinnampo, Korea; Jordan.

Family MICROSTOMIDÆ.

Nansenia ardesiaca Jordan and Thompson, Memoirs Carnegie Museum, VI, 1914, 210.

Type, No. 6023, 190 mm. Okinose, Sagami Sea, Japan; Jordan.

Order APODES.

Family CONGRIDÆ (Leptocephalidæ).

Leptocephalus ectenurus Jordan and Richardson, Memoirs Carnegie Museum, IV, 1909, 171.

Type, No. 245, Takao, Formosa; Hans Sauter.

Family OPICHTHYIDÆ.

Ophichthus evermanni Jordan and Richardson, Memoirs Carnegie Museum, IV, 1909, 172.

Type, No. 246, Takao, Formosa; Hans Sauter.

Sphagebranchus conklini Eigenmann, Annals Carnegie Museum, X, 1916, 55.

Type, No. 6710, 235 mm. New Providence, Bahamas; Coll. E. G. Conklin.

Family MURÆNIDÆ.

Gymnothorax leucostigma Jordan and Richardson, Memoirs Carnegie Museum, IV, 1909, 174.

Type, No. 253, 31 inches, Takao, Formosa; Hans Sauter.

Order HETEROGNATHI.

Family CHARACINIDÆ (Characidae).

SUBFAMILY BIVIBRANCHIINÆ.

Bivibranchia protractila Eigenmann, Memoirs Carnegie Museum, V, 1912, 259.

Type, No. 1873, 115 mm., Bartica sand-bank, British Guiana; Eigenmann.

SUBFAMILY CURIMATINÆ.

Curimatus atratoënsis Eigenmann, Indiana University Studies, No. 16, 1912, 19.

Type, No. 4814, 105 mm., Quibdo, Colombia; Eigenmann.

Curimatus issororoënsis Eigenmann, Memoirs Carnegie Museum, V, 1912, 266.

Type, No. 2119, 104 mm., Issororo, British Guiana; S. E. Shideler.

Curimatus metæ Eigenmann, Memoirs Carnegie Museum, IX, 1922, 230.

Type, No. 3844, 119 mm., Quebrada Cramalote, Villavicencio, Colombia; Coll. M. Gonzales.

Curimatus morawhannæ Eigenmann, Memoirs Carnegie Museum, V, 1912, 266.

Type, No. 2122, 90 mm., Morawhanna, British Guiana, S. E. Shideler.

Curimatus patiæ Eigenmann, Indiana University Studies, No. 19, 1914, 12.

Type, No. 5368, 168 mm., Barbacoas, Colombia; Henn and Wilson.

SUBFAMILY PROCHILODINÆ.

Prochilodus maripicru Eigenmann, Memoirs Carnegie Museum, V, 1912, 271.

Type, No. 2066, 282 mm., Maripicru Creek, British Guiana; Eigenmann.

SUBFAMILY CHILODINÆ.

Tylobranchus maculosus Eigenmann, Memoirs Carnegie Museum, V, 1912, 272.

Type, No. 1923, 113 mm., Creek below Potaro Landing, British Guiana; Eigenmann.

SUBFAMILY HEMIODONTINÆ.

Apareiodon hasemani Eigenmann, Annals Carnegie Museum, X, 1916, 75.

Type, No. 6587, 75 mm., Pirapora; Haseman.

Apareiodon itapicuruensis Eigenmann and Henn, Annals Carnegie Museum, X, 1916, 72.

Type, No. 5804, 78 mm., Rio Paiaia, tributary of Rio Itapicuru; Haseman.

Hemiodus paraguayæ Eigenmann and Henn, Annals Carnegie Museum, X, 1916, 87.

Type, No. 5701, 57 mm., Lagoa de Parnagua; Haseman.

Parodon bifasciatus Eigenmann, Memoirs Carnegie Museum, V, 1912, 274.

Type, No. 1925, 104 mm., Maripicru Creek, British Guiana; Eigenmann.

SUBFAMILY NANNOSTOMATINÆ.

Archicheir minutus Eigenmann, Annals Carnegie Museum, VI, 1909, 46.

Type, No. 1186, 26 mm., Christianburg, British Guiana; Eigenmann.

Characidium blennioides Eigenmann, Annals Carnegie Museum, VI, 1909, 37.

Type, No. 1144, 52 mm., Erukin, British Guiana; Eigenmann.

Characidium catenatum Eigenmann, Annals Carnegie Museum, VI, 1909, 40.

Type, No. 1153, 38 mm., Warraputa, British Guiana; Eigenmann.

Characidium caucanum Eigenmann, Indiana University Studies, No. 16, 1912, 25.

Type, No. 4847, 51 mm., Cali, Colombia; Eigenmann.

Characidium laterale Eigenmann, Annals Carnegie Museum, VI, 1909, 36.

Type, No. 1141, 37 mm., Amatuk, British Guiana; Eigenmann.

Characidium pellucidum Eigenmann, Annals Carnegie Museum, VI, 1909, 39.

Type, No. 1156, 39 mm., Gluck Island, British Guiana; Eigenmann.

Characidium phoxocephalum Eigenmann, Indiana University Studies, No. 16, 1912, 26.

Type, No. 4851, 68 mm., Paila, Colombia; Eigenmann.

Characidium pteroides Eigenmann, Annals Carnegie Museum, VI, 1909, 40.

Type, No. 1157, 28 mm., Konawaruk, British Guiana; Eigenmann.

Characidium vintoni Eigenmann, Annals Carnegie Museum, VI, 1909, 36.

Type, No. 1142, 76 mm., Shrimp Creek, British Guiana; Eigenmann.

Characidium zebra Eigenmann, Annals Carnegie Museum, VI, 1909, 38.

Type, No. 1151, 52.5 mm., Maripicru Creek, Ireng River, British Guiana; Eigenmann.

Nannostomus marginatus Eigenmann, Annals Carnegie Museum, VI, 1909, 41.

Type, No. 1171, 26 mm., Maduni Creek, British Guiana; Eigenmann.

Nannostomus minimus Eigenmann, Annals Carnegie Museum, VI, 1909, 42.

Type, No. 1165, 21 mm., Erukin, British Guiana; Eigenmann.

Nannostomus simplex Eigenmann, Annals Carnegie Museum, VI, 1909, 42.

Type, No. 1167, 25 mm., Lama Stop-off, British Guiana; Eigenmann.

Poecilobrycon auratus Eigenmann, Annals Carnegie Museum, VI, 1909, 43.

Type, No. 1161, 32 mm., Konawaruk, British Guiana; Eigenmann.

Poecilobrycon erythrurus Eigenmann, Annals Carnegie Museum, VI, 1909, 44.

Type, No. 1168, 33 mm., Rockstone sand-bank, British Guiana; Eigenmann.

Poecilobrycon harrisoni Eigenmann, Annals Carnegie Museum, VI, 1909, 43.

Type, No. 1160, 55 mm., Canal at Christianburg, British Guiana; Eigenmann.

- Pœcilobrycon ocellatus** Eigenmann, Annals Carnegie Museum, VI, 1909, 45.
Type, No. 1179, 41 mm., Wismar, British Guiana; Eigenmann.

SUBFAMILY ANOSTOMATINÆ.

- Anostomus plicatus** Eigenmann, Memoirs Carnegie Museum, V, 1912, 296.
Type, No. 1861, 86 mm., Crab Falls, British Guiana; Eigenmann.

- Leporellus timbore** Eigenmann, Memoirs Carnegie Museum, IX, 1922, 117.
Type, No. 3876, (indicated in catalogue of Carnegie Museum), Pirapora, Rio das Velhas, Brazil; Haseman.

- Leporinodus retropinnis** Eigenmann, Memoirs Carnegie Museum, IX, 1922, 116.
Type, No. 3875, 230 mm., Piracicaba, Brazil; Haseman.

- Leporinus alternus** Eigenmann, Memoirs Carnegie Museum, V, 1912, 307.
Type, No. 1827, 200 mm., Tukeit, British Guiana; Eigenmann.

- Leporinus arcus** Eigenmann, Memoirs Carnegie Museum, V, 1912, 300.
Type, No. 1832, 206 mm., Tukeit, British Guiana; Eigenmann.

- Leporinus granti** Eigenmann, Memoirs Carnegie Museum, V, 1912, 307.
Type, No. 1851, 144 mm., Maripicru, British Guiana; Eigenmann.

- Schizodontopsis laticeps** Eigenmann, Memoirs Carnegie Museum, V, 1912, 299.
Type, No. 1825, 264 mm., Crab Falls, British Guiana; Eigenmann.

SUBFAMILY CRENUCHINÆ.

- Pœcilocharax bovallii** Eigenmann, Annals Carnegie Museum, VI, 1909, 34.
Type, No. 1136, male, 43 mm., Creek at Savannah Landing, British Guiana; Eigenmann.

SUBFAMILY CHEIRODONTINÆ (Aphyocharacinæ).

- Aphyocharax erythrurus** Eigenmann, Memoirs Carnegie Museum, V, 1912, 313.
Type, No. 1879, 57 mm., Rockstone sand-bank, British Guiana; Eigenmann.

- Aphyocharax melanotus** Eigenmann, Memoirs Carnegie Museum, V, 1912, 312 = *Megalamphodus melanotus*.
Type, No. 1877, 43 mm., Rockstone sand-bank, British Guiana; Eigenmann.
- Aphyocharax paraguayensis** Eigenmann, Memoirs Carnegie Museum, VII, 1915, 33.
Type, No. 6906, 25 mm., Caceres; Haseman.
- Aphyocheiroduon hemigrammus** Eigenmann, Memoirs Carnegie Museum, VII, 1915, 59.
Type, No. 6802, 45 mm., Jaquara; Haseman.
- Aphyodite grammica** Eigenmann, Memoirs Carnegie Museum, V, 1912, 314.
Type, No. 1882, 32 mm., Konawaruk, British Guiana; Eigenmann.
- Bleptonema amazonæ** Eigenmann, Indiana University Studies, No. 20, 1914, 44 = *Prionobrama filigera* (Cope).
Type, No. 5497, 54 mm., Santarem, Brazil; Haseman.
- Bleptonema paraguayensis** Eigenmann, Indiana University Studies, No. 20, 1914, 44 = *Prionobrama paraguayensis*.
Type, No. 5499, 40 mm., Corumba; Haseman.
- Cheirodon madeiræ** Eigenmann, Memoirs Carnegie Museum, VII, 1915, 76.
Type, No. 6847, 34 mm., San Joaquin, Bolivia; Haseman.
- Cheirodon microdon** Eigenmann, Memoirs Carnegie Museum, VII, 1915, 80.
Type, No. 6850, 42 mm., Caceres, Upper Paraguay; Haseman.
- Cheirodon notomelas** Eigenmann, Memoirs Carnegie Museum, VII, 1915, 74.
Type, No. 6812, 35 mm., Miguel Calmone, Tieté basin; Haseman.
- Cheirodon parahybæ** Eigenmann, Memoirs Carnegie Museum, VII, 1915, 70.
Type, No. 6841, 38 mm., Campos; Haseman.
- Cheirodon stenodon** Eigenmann, Memoirs Carnegie Museum, VII, 1915, 82.
Type, No. 6848, 33 mm., Bebedouro, Rio Grande; Haseman.
- Compsura heterura** Eigenmann, Memoirs Carnegie Museum, VII, 1915, 61.
Type, No. 6808, 36 mm., Queimadas, Rio Itapicurú; Haseman.
- Holesthes heterodon** Eigenmann, Memoirs Carnegie Museum, VII, 1915, 87.
Type, No. 6875, female, 48 mm., Jaguará, Rio Grande into Rio Paraná; Haseman.

Macropsobrycon uruguayanae Eigenmann, Memoirs Carnegie Museum, VII, 1915, 48.

Type, No. 6895, 46 mm., Cacequy; Haseman.

Megalamphodus megalopterus Eigenmann, Memoirs Carnegie Museum, VII, 1915, 50.

Type, No. 6806, 35 mm., Caceres; Haseman.

Megalamphodus micropterus Eigenmann, Memoirs Carnegie Museum, VII, 1915, 54.

Type, No. 6900, 30 mm., Lagoa do Porto, Rio San Francisco; Haseman.

Microschemobrycon guaporensis Eigenmann, Memoirs Carnegie Museum, VII, 1915, 56.

Type, No. 6910, 37 mm., Maciél, Rio Guaporé; Haseman.

Odontostilbe hastatus Eigenmann, Indiana University Studies, No. 18, 1913, 27 = *Odontostilbe hastata*.

Type, No. 5103, 40 mm., Soplaviento, Colombia; Eigenmann.

Odontostilbe melandetus Eigenmann, Memoirs Carnegie Museum, V, 1912, 312 = *Odontostilbe melandeta*.

Type, No. 1878, 27 mm., Locality ? British Guiana; Eigenmann.

Oligobrycon microstomus Eigenmann, Memoirs Carnegie Museum, VII, 1915, 57.

Type, No. 6898, 39 mm., Jacarehy on Rio Parahyba; Haseman.

Parecbasis cyclolepis Eigenmann, Indiana University Studies, No. 20, 1914, 45.

Type, No. 5495, 74 mm., San Antonio de Rio Madeira; Haseman.

Phenagoniates wilsoni Eigenmann, Indiana University Studies, No. 19, 1914, 2 = *Phanagoniates macrolepis* (Meek and Hildebrand).

Type, No. 5354, 41 mm., Managru, Colombia; C. E. Wilson.

Probolodus heterostomus Eigenmann, Annals Carnegie Museum, VIII, 1911, 164.

Type, No. 2973, 63 mm., Campos; Haseman.

Spintherobolus broccæ Myers, Annals Carnegie Museum, XVI, 1925, 143.

Type, No. 7979, 23.5 mm., hills behind Rio de Janeiro, Brazil.

Spintherobolus papilliferus Eigenmann, Annals Carnegie Museum, VIII, 1911, 167.

Type, No. 3582, 41 mm., Alto de Serra, São Paulo, Brazil; Haseman.

SUBFAMILY AGONIATINÆ.

Agoniates anchovia Eigenmann, Indiana University Studies, No. 20, 1914, 46.

Type, No. 5216, 127 mm., Villa Bella; Haseman.

SUBFAMILY BRYCONINÆ.

Brycon henni Eigenmann, Indiana University Studies, No. 18, 1913, 26.

Type, No. 5152, 247 mm., Caldas, Colombia; Eigenmann.

Brycon siebenthalæ Eigenmann, Memoirs Carnegie Museum, V, 1912, 372.

Type, No. 1819, 204 mm., Mud Creek, Aruka River, British Guiana; Eigenmann.

SUBFAMILY TETRAGONOPTERINÆ.

Astyanax abramoides Eigenmann, Annals Carnegie Museum, VI, 1909, 21.

Type, No. 1028, 112 mm., Tumatumari, Potaro River, British Guiana; Eigenmann.

Astyanax aurocaudatus Eigenmann, Indiana University Studies, No. 18, 1913, 26.

Type, No. 5162, 60 mm., Boquilla, Colombia; Eigenmann.

Astyanax bimaculatus novæ Eigenmann, Annals Carnegie Museum, VIII, 1911, 175.

Type, no particular specimen designated, one of the series No. 3278, Rio Sapon, Prazeres, Bahia, Brazil; Haseman.

Astyanax daguæ Eigenmann, Indiana University Studies, No. 18, 1913, 23.

Type, No. 5052, 58 mm., Raspadura, Colombia; Eigenmann.

Astyanax essequibensis Eigenmann, Annals Carnegie Museum, VI, 1909, 17.

Type, No. 1018, 53 mm., Tumatumari, British Guiana; Eigenmann.

Astyanax guaporensis Eigenmann, Annals Carnegie Museum, VIII, 1911, 176.

Type, No. 3351, 49 mm., Maciel, Rio Guaporé; Haseman.

Astyanax guianensis Eigenmann, Annals Carnegie Museum, VI, 1909, 16.

Type, No. 1013, 54 mm., Warraputa, British Guiana; Eigenmann.

Astyanax gymnogenys Eigenmann, Annals Carnegie Museum, VIII, 1911, 179.

Type, No. 3350, 87 mm., Porto União, Rio Iguassú; Haseman.

Astyanax hasemani Eigenmann, Indiana University Studies, No. 19, 1914, 10.

Type, No. 5476, 55 mm., Porto Alegre, Colombia; Haseman.

Astyanax heterurus Eigenmann and Wilson, Indiana University Studies, No. 19, 1914, 11 = *Astyanax fasciatus heterurus*.

Type, No. 5392, 50 mm., Rio Truando, Colombo; C. E. Wilson.

Astyanax magdalenæ Eigenmann and Henn, Annals Carnegie Museum, X, 1916, 89.

Type, No. 5822, 53 mm., Girardot, Colombia; Eigenmann.

Astyanax marionæ Eigenmann, Annals Carnegie Museum, VIII 1911, 175.

Type, No. 3353, 54 mm., 6 miles from San Luiz de Caceres; Haseman.

Astyanax metæ Eigenmann, Indiana University Studies, No. 19, 1914, 11.

Type, No. 5457, 130 mm., Rio Negro at Villavicencio, Colombia; Gonzales.

Astyanax microlepis Eigenmann, Indiana University Studies, No. 18, 1913, 24.

Type, No. 5001, 88 mm., Piedra Moler, Colombia; Eigenmann.

Astyanax mucronatus Eigenmann, Annals Carnegie Museum, VI, 1909, 19.

Type, No. 1025, 53 mm., Tumatumari, Potaro River, British Guiana; Eigenmann.

Astyanax mutator Eigenmann, Annals Carnegie Museum, VI, 1909, 18.

Type, No. 1023, 53 mm., Savannah Landing, Upper Potaro River, British Guiana; Eigenmann.

Astyanax paranahybæ Eigenmann, Annals Carnegie Museum, VIII, 1911, 177.

Type, No. 3356, 54 mm., Rio Paranyba; Haseman.

Astyanax potaroënsis Eigenmann, Annals Carnegie Museum, VI, 1909, 22.

Type, No. 1037, 58 mm., Amatuk Cataract, Potaro River, British Guiana; Eigenmann.

Astyanax ribeiræ Eigenmann, Annals Carnegie Museum, VIII, 1911, 177.

Type, No. 3368, 66 mm., Xiririca; Haseman.

Astyanax ruberrimus Eigenmann, Indiana University Studies, No. 18, 1913, 25.

Type, No. 4912, 107 mm., Istmina, Colombia; Eigenmann.

Bryconamericus alpha Eigenmann, Indiana University Studies, No. 19, 1914, 7.

Type, No. 5463, 59 mm., Villavicencio, Colombia; Gonzales.

Bryconamericus beta Eigenmann, Indiana University Studies, No. 19, 1914, 7.

Type, No. 5465, 57 mm., Villavicencio, Colombia; Gonzales.

Bryconamericus boquixæ Eigenmann, Indiana University Studies, No. 18, 1913, 20 = *Hemibrycon boquillæ* (Eigenmann).

Type, No. 5059, 48 mm., to base of caudal, Boquilla, Colombia; Eigenmann.

Bryconamericus caucanus Eigenmann, Indiana University Studies, No. 18, 1913, 17.

Type, No. 5031, 80 mm., Piedra Moler, Colombia; Eigenmann.

Bryconamericus chocoënsis Eigenmann, Indiana University Studies, No. 18, 1913, 14 = *Argopleura chocoënsis*.

Type, No. 5036, 61 mm., Istmina, Colombia; Eigenmann.

Bryconamericus cismontanus Eigenmann, Indiana University Studies, No. 19, 1914, 4.

Type, No. 5459, 60 mm., Villavicencio, Colombia; Gonzales.

Bryconamericus conventus Eigenmann, Indiana University Studies, No. 18, 1913, 13 = *Argopleura conventa*.

Type, No. 5060, 47 mm., Soplaviento, Colombia; Eigenmann.

Bryconamericus decurrens Eigenmann, Indiana University Studies, No. 18, 1913, 20 = *Hemibrycon decurrens* (Eigenmann).

Type, No. 5055, 57 mm., to base of caudal, Soplaviento, Colombia; Eigenmann.

Bryconamericus dentatus Eigenmann, Indiana University Studies, No. 18, 1913, 19 = *Hemibrycon dentatus* (Eigenmann).

Type, No. 5054, 98 mm., Piedra Moler, Colombia; Eigenmann.

Bryconamericus deuterodonoides Eigenmann, Indiana University Studies, No. 19, 1914, 5.

Type, No. 5461, 43 mm., Villavicencio, Colombia; Gonzales.

Bryconamericus diquensis Eigenmann, Indiana University Studies, No. 18, 1913, 14 = *Argopleura diquensis*.

Type, No. 5072, 60 mm., Soplaviento, Colombia; Eigenmann.

Bryconamericus henni Eigenmann, Indiana University Studies, No. 19, 1914, 6 = *Phenacobrycon henni* (Eigenmann).

Type, No. 5410, 48 mm., Vinces, Ecuador; Henn.

Bryconamericus hyphesson Eigenmann, Annals Carnegie Museum, VI, 1909, 32.

Type, No. 1070, 37.5 mm., Tumatumari, British Guiana; Eigenmann.

Bryconamericus magdalenensis Eigenmann, Indiana University Studies, No. 18, 1913, 14 = *Argopleura magdalenensis*.

Type, No. 5063, 71 mm., Girardot, Colombia; Eigenmann.

Bryconamericus novæ Eigenmann and Henn, Indiana University Studies, No. 24, 1914, 234.

Type, No. 3568, 56 mm., Below Cachoeira da Velha near Piabana, Brazil; Haseman.

Bryconamericus ortholepis Eigenmann, Indiana University Studies, No. 18, 1913, 15.

Type, No. 5088, 48 mm., Raspadura, Colombia; Eigenmann.

Bryconamericus scopiferus Eigenmann, Indiana University Studies, No. 18, 1913, 16.

Type, No. 5026, 90 mm., Istmina, Colombia; Eigenmann.

Bryconamericus scopiferus guaytaræ Eigenmann and Henn, Indiana University Studies, No. 19, 1914, 7.

Type, No. 5474, 76 mm., Rio Patia at mouth of Rio Guaitara, Colombia; Henn.

Bryconamericus tolimæ Eigenmann, Indiana University Studies, No. 18, 1913, 18 = *Hemibrycon tolimæ* (Eigenmann).

Type, No. 5057, 118 mm., Ibagué, Colombia; Eigenmann.

Creagrutus beni Eigenmann, Annals Carnegie Museum, VIII, 1911, 172.

Type, No. 3216, 53 mm., Villa Bella on Rio Beni; Haseman.

Creagrutus brevipinnis Eigenmann, Indiana University Studies, No. 18, 1913, 10.

Type, No. 4887, 61 mm., Piedra Moler, Colombia; Eigenmann.

Creagrutus caucanus Eigenmann, Indiana University Studies, No. 18, 1913, 9.

Type, No. 4895, 113 mm., Paila, Colombia; Eigenmann.

Creagrutus magdalenæ Eigenmann, Indiana University Studies, No. 18, 1913, 8.

Type, No. 4880, 78 mm., Girardot, Colombia; Eigenmann.

Creagrutus melanzonus Eigenmann, Annals Carnegie Museum, VI, 1909, 30.

Type, No. 1067, 44 mm., Crab Falls, British Guiana; Eigenmann.

Dermatocheir catalepta Durbin, Annals Carnegie Museum, VI, 1909, 55 = *Hyphessobrycon cataleptus*.

Type, No. 1198, 18 mm., Tumatumari above the Fall, British Guiana; Eigenmann.

Deuterodon acanthogaster Eigenmann, Annals Carnegie Museum, VIII, 1911, 179.

Type, No. 3395, 54 mm., Corumbá; Haseman.

Deuterodon pinnatus Eigenmann, Annals Carnegie Museum, VI, 1909, 25.

Type, No. 1046, 62 mm., Amatuk, Lower Potaro River, British Guiana; Eigenmann.

Deuterodon potaroënsis Eigenmann, Annals Carnegie Museum, VI, 1909, 27.

Type, No. 1053, 43 mm., Amatuk, Potaro River, British Guiana; Eigenmann.

Genycharax tarpon Eigenmann, Indiana University Studies, No. 16, 1912, 22.

Type, No. 4808, 174 mm., Cartago, Colombia; Eigenmann.

Hasemanian bilineata Mrs. Ellis, Annals Carnegie Museum, VIII, 1911, 150.

Type, No. 3001, 41 mm., Alto da Serra, São Paulo, Brazil; Haseman.

Hasemanian maxillaris Mrs. Ellis, Annals Carnegie Museum, VIII, 1911, 148.

Type, No. 2937, 29 mm., Porto União, Rio Iguassú, Brazil; Haseman.

Hasemanian melanura Mrs. Ellis, Annals Carnegie Museum, VIII, 1911, 149.

Type, No. 3002, 35 mm., Porto União, Rio Iguassú, Brazil; Haseman.

Hemibrycon colombianus Eigenmann, Indiana University Studies, No. 19, 1914, 8.

Type, No. 5470, 106 mm., Rio San Gil, Santander, Colombia; Gonzales.

Hemigrammus analis Durbin, Annals Carnegie Museum, VI, 1909, 64.

Type, No. 1466, 35 mm., Rockstone, British Guiana; Eigenmann.

Hemigrammus brevis Mrs. Ellis, Annals Carnegie Museum, VIII, 1911, 161.

Type, No. 3068, 35 mm., Barreiras, Lagôas of Rio Grande; Haseman.

Hemigrammus cylindricus Durbin, Annals Carnegie Museum, VI, 1909, 62.

Type, No. 1461, 57 mm., Tumatumari, British Guiana; Eigenmann.

Hemigrammus erythrozonus Durbin, Annals Carnegie Museum, VI, 1909, 56.

Type, No. 1448, 32 mm., Erukin, British Guiana; Eigenmann.

Hemigrammus iota Durbin, Annals Carnegie Museum, VI, 1909, 60.

Type, No. 1458, 18 mm., Gluck Island, British Guiana; Eigenmann.

Hemigrammus marginatus Mrs. Ellis, Annals Carnegie Museum, VIII, 1911, 159.

Type, No. 3053, 38 mm., Rio Itapicurú, Queimadas; Haseman.

Hemigrammus orthus Durbin, Annals Carnegie Museum, VI, 1909, 61.

Type, No. 1477, 28 mm., Tukeit, British Guiana; Eigenmann.

Hemigrammus rodwayi Durbin, Annals Carnegie Museum, VI, 1909, 58.

Type, No. 1450, 46 mm., Georgetown trenches, British Guiana; Eigenmann.

Hypessobrycon bifasciatus Mrs. Ellis, Annals Carnegie Museum, VIII, 1911, 156.

Type, No. 3026, male, 44 mm., Campos, Rio Parahyba; Haseman.

Hypessobrycon duragenys Mrs. Ellis, Annals Carnegie Museum, VIII, 1911, 155.

Type, No. 3023, 68 mm., Mogy das Cruzes, Rio Tieté; Haseman.

Hypessobrycon eos Durbin, Annals Carnegie Museum, VI, 1909, 69.

Type, No. 1194, 36 mm., Creek between Potaro Landing and Kangaruma; Eigenmann.

Hypessobrycon melanopleurus Mrs. Ellis, Annals Carnegie Museum, VIII, 1911, 157.

Type, No. 3035, 34 mm., Alto da Serra, São Paulo, Brazil; Haseman.

Hypessobrycon minimus Durbin, Annals Carnegie Museum, VI, 1909, 68.

Type, No. 1193, 18 mm., Cane Grove Corner, British Guiana; Eigenmann.

Hypessobrycon minor Durbin, Annals Carnegie Museum, VI, 1909, 65.

Type, No. 1189, 19 mm., Konawaruk, British Guiana; Eigenmann.

Hyphessobrycon parvulus Mrs. Ellis, Annals Carnegie Museum, VIII, 1911, 153.

Type, No. 3011, 30 mm., Alagoinhas, Rio Catú; Haseman.

Hyphessobrycon poecilioides Eigenmann, Indiana University Studies, No. 18, 1913, 29.

Type, No. 5091, female, 53 mm., Cali, Colombia.

Hyphessobrycon proteus Eigenmann, Indiana University Studies, No. 18, 1913, 28 = *Hyphessobrycon inconstans* Eigenmann and Ogle.

Type, No. 5094, 74 mm., Quibdo, Colombia; Eigenmann.

Hyphessobrycon reticulatus Mrs. Ellis, Annals Carnegie Museum, VIII, 1911, 153.

Type, No. 3018, 48 mm., Campos, Rio Parahyba; Haseman.

Hyphessobrycon rosaceus Durbin, Annals Carnegie Museum, VI, 1909, 67.

Type, No. 1190, 35 mm., Gluck Island, British Guiana; Eigenmann.

Hyphessobrycon stictus Durbin, Annals Carnegie Museum, VI, 1909, 71.

Type, No. 1197, 38 mm., Lama Stop-off, British Guiana; Eigenmann.

Hyphessobrycon taurocephalus Mrs. Ellis, Annals Carnegie Museum, VIII, 1911, 151.

Type, No. 3007, 55 mm., Serrinha Paraná, Rio Iguassú, Brazil; Haseman.

Microgenys minutus Eigenmann, Indiana University Studies, No. 18, 1913, 22.

Type, No. 5007, 45 mm., Piedra Moler, Colombia; Eigenmann.

Mœnkhausia browni Eigenmann, Annals Carnegie Museum, VI, 1909, 13.

Type, No. 1004, 66 mm., Aruataima Falls, Upper Potaro River, British Guiana; Eigenmann.

Mœnkhausia lepidura hasemani Eigenmann, Memoirs Museum of Comparative Zoology, XLIII, 1917, 102.

Type, No. 3746, 45 mm., Santarem; Haseman.

Mœnkhausia profunda Eigenmann, Memoirs Carnegie Museum, V, 1912, 322 = *Mœnkhausia bondi* (Fowler).

Type, No. 2207, 51 mm., Issorora Rubber Station, British Guiana; Shideler.

Mœnkhausia shideleri Eigenmann, Annals Carnegie Museum, VI, 1909, 15.

Type, No. 1012, 65 mm., Bartica, British Guiana; Eigenmann.

Phenacogaster beni Eigenmann, Annals Carnegie Museum, VIII, 1911, 174.

Type, No. 3229, 48 mm., Villa Bella, Rio Beni; Haseman.

Phenacogaster franciscoënsis Eigenmann, Annals Carnegie Museum, VIII, 1911, 173.

Type, No. 3231, 38 mm., Boqueiras, near mouth of Rio Preto; Haseman.

Phenacogaster megalostictus Eigenmann, Annals Carnegie Museum, VI, 1909, 28.

Type, No. 1056, 65 mm., Tumatumari, British Guiana; Eigenmann.

Phenacogaster microstictus Eigenmann, Annals Carnegie Museum, VI, 1909, 30.

Type, No. 1063, 48 mm., Tumatumari, Lower Potaro River, British Guiana; Eigenmann.

Piabina analis Eigenmann, Indiana University Studies, No. 19, 1914, 8.

Type, No. 5478, 37 mm., Caceres; Haseman.

Psalidodon gymnodontus Eigenmann, Annals Carnegie Museum, VIII, 1911, 166.

Type, No. 3204, 189 mm., Porto União, Rio Iguassú; Haseman.

Pristella aubynei Eigenmann, Annals Carnegie Museum, VI, 1909, 24.

Type, No. 1042, 50 mm., Lama Stop-off, British Guiana; Eigenmann.

Vesicatrux tegatus Eigenmann, Annals Carnegie Museum, VIII, 1911, 174.

Type, No. 3201, 33 mm., Jaurú, Upper Paraguay Basin; Haseman.

SUBFAMILY RHOADSINÆ.

Parastremma sadina Eigenmann, Indiana University Studies, No. 16, 1912, 20.

Type, No. 4812, 136 mm., Istmina, Colombia; Eigenmann.

SUBFAMILY GLANDULOCAUDINÆ.

Gephyrocharax caucanus Eigenmann, Indiana University Studies, No. 16, 1912, 24.

Type, No. 4802, 62 mm., Cartago, Colombia; Eigenmann.

Gephyrocharax chocoensis Eigenmann, Indiana University Studies, No. 16, 1912, 23.

Type, No. 4806, 53 mm., Istmina, Colombia; Eigenmann.

- Gephyrocharax melanocheir** Eigenmann, Indiana University Studies, No. 16, 1912, 24.
Type, No. 4839, 44 mm., Bernal Creek near Honda, Colombia; Eigenmann.
- Glandulocauda inequalis** Eigenmann, Annals Carnegie Museum, VIII, 1911, 169.
Type, No. 3555, 40 mm., Porto Alegre; Haseman.
- Glandulocauda melanogenys** Eigenmann, Annals Carnegie Museum, VIII, 1911, 168.
Type, No. 3553, 49 mm., Alto da Serra, São Paulo, Brazil; Haseman.
- Glandulocauda melanopleura** Eigenmann, Annals Carnegie Museum, VIII, 1911, 170.
Type, No. 3557, 51 mm., Serrinha Paran , Rio Iguass , Brazil; Haseman.
- Hysteronotus megalostomus** Eigenmann, Annals Carnegie Museum, VIII, 1911, 171.
Type, No. 3551, 45 mm., Rio das Velhas; Haseman.
- Microbrycon minutus** Eigenmann and Wilson, Indiana University Studies, No. 19, 1914, 3.
Type, No. 5422, 24 mm., Rio Truando, Colombia; Wilson.
- Pseudocorynopoma heterandria** Eigenmann, Indiana University Studies, No. 20, 1914, 39.
Type, No. 5222, female, 80 mm., Xiririca; Haseman.
- Pterobrycon landoni** Eigenmann, Indiana University Studies, No. 18, 1913, 3.
Type, No. 5051, 25 mm., Boca de Raspadura, Colombia; Eigenmann.
- Stevardia aliata** Eigenmann, Indiana University Studies, No. 20, 1914, 37.
Type, No. 5215, 75 mm., Rio Negro, Villavicencio; Gonzales.

SUBFAMILY STETHAPRIONINÆ.

- Fowlerina franciscensis** Eigenmann, Indiana University Studies, No. 20, 1914, 45.
Type, No. 5240, 72 mm., Barreiras, Lagoas of Rio Grande; Haseman.
- Stethaprion crenatus** Eigenmann, Annals Carnegie Museum, X, 1916, 80.
Type, No. 5228, 95 mm., San Joaquin, Bolivia; Haseman.

SUBFAMILY GASTEROPELECINÆ.

Thoracocharax brevis Eigenmann, Indiana University Studies, No. 16, 1912, 25 = *Thoracocharax maculatus* (Steindachner).

Type, No. 4845, 47 mm., Raspadura, Colombia; Eigenmann.

Thoracocharax magdalenæ Eigenmann, Indiana University Studies, No. 16, 1912, 25.

Type, No. 4846, 50 mm., Girardot, Colombia; Eigenmann.

SUBFAMILY SERRASALMINÆ.

Pygocentrus bilineatus Eigenmann, Annals Carnegie Museum, VI, 1909, 47.

Type, No. 1072, 102 mm., Aruka River, British Guiana; Eigenmann.

Serrasalmo hollandi Eigenmann, Annals Carnegie Museum, IX, 1915, 251.

Type, No. 5792, 130 mm., Maciél, Rio Guaporé; Haseman.

Serrasalmo humeralis gracilior Eigenmann, Annals Carnegie Museum, IX, 1915, 257.

Type, particular specimen not designated, two specimens, No. 5791, Maciél, Rio Guaporé; Haseman.

SUBFAMILY MYLINÆ.

Metynnis guaporensis Eigenmann, Annals Carnegie Museum, IX, 1915, 267.

Type, No. 5729, 99 mm., Maciél, Rio Guaporé; Haseman.

Metynnis roosevelti Eigenmann, Annals Carnegie Museum, IX, 1915, 268.

Type, No. 5740, 115 mm., Manaus, Brazil; Haseman.

Mylosoma ocellatum Eigenmann, Annals Carnegie Museum, IX, 1915, 265.

Type, No. 5629, 44 mm., Villa Hays, Paraguay; Haseman.

SUBFAMILY CHARACINÆ.

Acanthocharax microlepis Eigenmann, Memoirs Carnegie Museum, V, 1912, 405.

Type, No. 2138, 105 mm., Tumatumari, British Guiana; Eigenmann.

Asiphonichthys hemigrammus Eigenmann, Memoirs Carnegie Museum, V, 1912, 403.

Type, No. 2137, 27 mm., Gluck Island, British Guiana; Eigenmann.

Charax rupununi Eigenmann, Memoirs Carnegie Museum, V, 1912, 402.

Type, No. 2135, 58 mm., Rupununi, British Guiana; Grant.

Cynopotamus essequibensis Eigenmann, Memoirs Carnegie Museum, V, 1912, 403.

Type, No. 2146, 175 mm., Potaro Landing, British Guiana; Eigenmann.

Heterocharax macrolepis Eigenmann, Memoirs Carnegie Museum, V, 1912, 406.

Type, No. 2142, 46 mm., Rockstone, British Guiana; Eigenmann.

Ræboides hildebrandi Eigenmann, Memoirs Carnegie Museum, IX, 1922, 162.

Type, No. 5186, specimen not designated, Istmina, Colombia; Eigenmann.

Ræboides magdalenæ Eigenmann, Memoirs Carnegie Museum, IX, 1922, 161.

Type, No. 5202, specimen not designated, Soplaviento, Colombia; Eigenmann.

Ræboides meeki Eigenmann, Memoirs Carnegie Museum, IX, 1922, 163.

Type, No. 3849, 130 mm., Quibdo, Colombia; Eigenmann.

Ræboides thurni Eigenmann, Memoirs Carnegie Museum, V, 1912, 399.

Type, No. 2149, 104 mm., Rockstone Sand Bank, British Guiana; Eigenmann.

SUBFAMILY ACESTRORHYNCHINÆ.

Acestrorhynchus nasutus Eigenmann, Memoirs Carnegie Museum, V, 1912, 411.

Type, No. 1959, 79 mm., Rockstone, British Guiana; Eigenmann.

Order GYMNONOTI.

Family GYMNOTIDÆ.

Gymnorhamphichthys hypostomus Ellis, in Eigenmann, Memoirs Carnegie Museum, V, 1912, 436.

Type, No. 3182, 215 mm., San Joaquin, Bolivia; Haseman.

Porotergus gimbeli Ellis, in Eigenmann, Memoirs Carnegie Museum, V, 1912, 441.

Type, No. 3197, 205 mm., Pará, Brazil; Haseman.

Porotergus gymnotus Ellis, in Eigenmann, Memoirs Carnegie Museum, V, 1912, 441.

Type, No. 1759, 70 mm., Amatuk, British Guiana; Eigenmann.

Sternarchus hasemani Ellis, Memoirs Carnegie Museum, VI, 1913, 147.

Type, No. 3191, 170 mm., Santarem, Brazil; Haseman.

Sternarchus leptorhynchus Ellis, in Eigenmann, Memoirs Carnegie Museum, V, 1912, 439.

Type, No. 1762, 260 mm., Amatuk, British Guiana; Eigenmann.

Sternarchus mariæ Eigenmann and Fisher, Indiana University Studies, No. 25, 1914, 236.

Type, No. 5594, 201 mm., Girardot, Colombia; Eigenmann.

Order **EVENTOGNATHI**.

Family **CYPRINIDÆ**.

Acahara jusanensis Jordan and Hubbs, Memoirs Carnegie Museum, X, 1925, 180.

Type, No. 7828, female, Lake Jusan, Prov. of Mutsu, Japan; Sotaro Saito.

Acheilognathus tabira Jordan and Thompson, Memoirs Carnegie Museum, VI, 1914, 220.

Type, No. 6007, Lake Biwa at Matsubara, Japan; Jordan.

Amblypharyngodon grandisquamis Jordan and Starks, Annals Carnegie Museum, XI, 1917, 438.

Type, No. 8050, 4 inches, Ceylon River at Colombo, Ceylon; Jordan.

Belligobio eristigma Jordan and Hubbs, Memoirs Carnegie Museum, X, 1925, 173.

Type, No. 7820, female, 118 mm., Okayama, Japan; K. Mikamo.

Culter aokii Oshima, Annals Carnegie Museum, XII, 1919, 250.

Type, No. 8248, 280 mm., Jitsugetsutan, Formosa; T. Aoki.

Formosania gilberti Oshima, Annals Carnegie Museum, XII, 1919, 194.

Type, No. 8222, 117 mm., Tamusui River near Shinten, Formosa; T. Aoki.

Gnathopogon iijimæ Oshima, Annals Carnegie Museum, XII, 1919, 219.

Type, No. 8234, 79 mm., Tozen River, Formosa; Aoki.

Gnathopogon ishikawæ Jordan and Thompson, Memoirs Carnegie Museum, VI, 1914, 215.

Type, No. 6014, female, 63 mm., Chikugo River, at Kurume, Japan; Jordan and Snyder.

Gnathopogon longifilis Jordan and Hubbs, Memoirs Carnegie Museum, X, 1925, 169.

Type, No. 7817, 49 mm., Ping-yang River, Korea; Wakiya.

Gnathopogon majimæ Jordan and Hubbs, Memoirs Carnegie Museum, X, 1925, 167.

Type, No. 7816, 43 mm., Ping-yang River, Korea; Wakiya.

Gnathopogon suwæ Jordan and Hubbs, Memoirs Carnegie Museum, X, 1925, 166.

Type, No. 7814, 72 mm., Lake Suwa at Kamisuwa in Shinshu, Japan; Jordan.

Gnathopogon tsuchigæ Jordan and Hubbs, Memoirs Carnegie Museum, X, 1925, 170.

Type, No. 7818, 69 mm., Ping-yang River, Korea; Wakiya.

Labeo fisheri Jordan and Starks, Annals Carnegie Museum, XI, 1917, 436.

Type, No. 8044, 14.5 inches, Mahaweli R. at Kandy, Ceylon; W. K. Fisher.

Labeo jordani Oshima, Annals Carnegie Museum, XII, 1919, 204.

Type, No. 8226, 340 mm., hatchery at Shori, Formosa; Oshima.

Moroco yamamotis Jordan and Hubbs, Memoirs Carnegie Museum, X, 1925, 182.

Type, No. 7829, 110 mm., Lake Yamanaka, Kosshu, Korea; Ishikawa.

Parapelecus eigenmanni Jordan and Metz, Memoirs Carnegie Museum, VI, 1913, 21.

Type, No. 4565, 5.5 inches, Suigen, Korea; Jordan.

Phoxiscus kikuchii Oshima, Annals Carnegie Museum, XII, 1919, 226.

Type, No. 8237, 60 mm., Bokusekikaku, Formosa; Y. Kikuchi.

Pseudaspius atrilatus Jordan and Thompson, Memoirs Carnegie Museum, VI, 1914, 231.

Type, No. 6012, Lake Biwa at Matsubara, Japan; Jordan.

Pseudaspius bergi Jordan and Metz, Memoirs Carnegie Museum, VI, 1913, 22.

Type, No. 4563, 4 inches, Chinnampo, Korea; Jordan.

Pseudaspius modestus Jordan and Metz, Memoirs Carnegie Museum, VI, 1913, 23.

Type, No. 4561, 2 inches, Chinnampo, Korea; Jordan.

Pseudoperilampus hondæ Jordan and Metz, Memoirs Carnegie Museum, VI, 1913, 20.

Type, No. 4566, 2 inches, Suigen, Korea; Jordan.

Puntius snyderi Oshima, Annals Carnegie Museum, XII, 1919, 216.

Type, No. 8231, 77 mm., Rigyokutsu, Nanto, Formosa; Aoki.

Rhodeus chosenicus Jordan and Metz, Memoirs Carnegie Museum, VI, 1913, 19.

Type, No. 4567, 1.84 inches, Suigen, Korea; Jordan.

Sarcocheilichthys morii Jordan and Hubbs, Memoirs Carnegie Museum, X, 1925, 175.

Type, No. 7824, female, 100 mm., Ping-yang River, Korea; Wakiya.

Scaphesthes tamusiensis Oshima, Annals Carnegie Museum, XII, 1919, 209.

Type, No. 8228, 230 mm., Tamusui River near Shinten, Formosa; Aoki.

Spinibarbus hollandi Oshima, Annals Carnegie Museum, XII, 1919, 218.

Type, No. 8233, 340 mm., Sobun R. near Tabani, Formosa; Aoki.

Order **NEMATOGNATHII.**

Family **ARIIDÆ.**

Netuma osakæ Jordan and Kasawa, Memoirs Carnegie Museum, X, 1925, 157.

Type, No. 7808, 375 mm., market at Osaka, Japan; Yamamoto.

Family **AUCHENIPTERIDÆ.**

Auchenipterus brevior Eigenmann, Memoirs Carnegie Museum, V, 1912, 202.

Type, No. 1715, 71 mm., Tumatumari, British Guiana; Eigenmann.

Auchenipterus demeraræ Eigenmann, Memoirs Carnegie Museum, V, 1912, 202.

Type, No. 1714, 115 mm., Wismar, British Guiana; Eigenmann.

Entomocorus benjamini Eigenmann, Annals Carnegie Museum, XI, 1917, 403.

Type, No. 7006, 59 mm., San Joaquin, Bolivia; Haseman.

Glanidium ribeiroi Haseman, Annals Carnegie Museum, VII, 1911, 381.

Type, No. 2877, 137 mm., Porto União da Victoria, Paraná, Brazil; Haseman.

Trachycorystes fisheri Eigenmann, Annals Carnegie Museum, X, 1916, 82.

Type, No. 6667, 217 mm., Rio Sucio, Colombia; Eigenmann.

Family DORADIDÆ.

Doras lentiginosus Eigenmann, Annals Carnegie Museum, XI, 1917, 401 = *Pterodoras lentiginosus*.

Type, No. 7048, 357 mm., Santarem, Brazil; Haseman.

Hemidoras leporhinus Eigenmann, Memoirs Carnegie Museum, V, 1912, 195 = *Opsodoras leporhinus*.

Type, No. 1624, 56 mm., Tumatumari, British Guiana; Eigenmann.

Hemidoras micropæus Eigenmann, Memoirs Carnegie Museum, V, 1912, 195 = *Doras micropæus*.

Type, No. 1636, 365 mm., Wismar, British Guiana; Eigenmann.

Hemidoras microstomus Eigenmann, Memoirs Carnegie Museum, V, 1912, 193 = *Doras microstomus*.

Type, No. 1650, 52 mm., Rockstone, British Guiana; Eigenmann.

Hemidoras notospilus Eigenmann, Memoirs Carnegie Museum, V, 1912, 196 = *Hassar notospilus* (Eigenmann).

Type, No. 1623, 70 mm., Crab Falls, British Guiana; Eigenmann.

Leptodoras linnelli Eigenmann, Memoirs Carnegie Museum, V, 1912, 191.

Type, No. 1626, 190 mm., Tumatumari, British Guiana; Eigenmann.

Family AGENEIOSIDÆ.

Ageneiosus guianensis Eigenmann, Memoirs Carnegie Museum, V, 1912, 204.

Type, No. 1712, 175 mm., Wismar, British Guiana; Eigenmann.

Ageneiosus madeirensis Fisher, Annals Carnegie Museum, XI, 1917, 426.

Type, No. 7143, 108 mm., San Joaquin, Bolivia; Haseman.

Ageneiosus marmoratus Eigenmann, Memoirs Carnegie Museum, V, 1912, 206.

Type, No. 1710, female, 175 mm., Creek below Potaro landing, British Guiana; Eigenmann.

Tympanopleura piperata Eigenmann, Memoirs Carnegie Museum, V, 1912, 203.

Type, No. 1708, male, 64 mm., Crab Falls, British Guiana; Eigenmann.

Family BAGRIDÆ.

Liobagrus nantoënis Oshima, Annals Carnegie Museum, XII, 1919, 183.

Type, No. 8217, 88 mm., Dainansho, Nanto, Formosa; Aoki.

Pseudobagrus adiposalis Oshima, Annals Carnegie Museum, XII, 1919, 181.

Type, No. 8216, 172 mm., Tamusui R. near Shinten, Formosa; Aoki.

Pseudobagrus taiwanensis Oshima, Annals Carnegie Museum, XII, 1919, 180.

Type, No. 8215, 152 mm., Tozen River near Taichu, Formosa; Aoki.

Family PIMELODIDÆ.

Brachyglanis frenata Eigenmann, Memoirs Carnegie Museum, V, 1912, 156.

Type, No. 1670, 49 mm., Amatuk, British Guiana; Eigenmann.

Brachyglanis melas Eigenmann, Memoirs Carnegie Museum, V, 1912, 157.

Type, No. 1672, 60 mm., Crab Falls, British Guiana; Eigenmann.

Brachyglanis phalacra Eigenmann, Memoirs Carnegie Museum, V, 1912, 157.

Type, No. 1671, 81 mm., Amatuk, British Guiana; Eigenmann.

Cephalosilurus fowleri Haseman, Annals Carnegie Museum, VII, 1911, 317.

Type, No. 2880, 310 mm., Cidade da Barra, Bahia; Haseman.

Cetopsorhamdia boquillæ Eigenmann, Memoirs Carnegie Museum, IX, 1922, 37.

Type, No. 3923, 81 mm., Boquilla, Colombia; Eigenmann.

Cetopsorhamdia nasus Eigenmann and Fisher, Annals Carnegie Museum, X, 1916, 83.

Type, No. 7124, 72 mm., Honda, Colombia; Eigenmann.

Chasmocranus brevior Eigenmann, Memoirs Carnegie Museum, V, 1912, 162.

Type, No. 1662, 56 mm., Waratuk, British Guiana; Eigenmann.

- Chasmocranus longior** Eigenmann, Memoirs Carnegie Museum, V, 1912, 160.
Type, No. 1655, 110 mm., Amatuk, British Guiana; Eigenmann.
- Chasmocranus rosæ** Eigenmann, Memoirs Carnegie Museum, IX, 1922, 220.
Type, No. 3841, 65 mm., Rio Negro, Villavicencio, Colombia; Gonzales.
- Cheirocerus eques** Eigenmann, Annals Carnegie Museum, XI, 1917, 398.
Type, No. 7254, 117 mm., Villa Bella; Haseman.
- Heptapterus stewarti** Haseman, Annals Carnegie Museum, VII, 1911, 376.
Type, No. 2850, 56 mm., Serrinha Paraná, Iguassú, Brazil; Haseman.
- Imparfinis hollandi** Haseman, Annals Carnegie Museum, VII, 1911, 383.
Type, No. 2864, 230 mm., Porto União da Victoria, Rio Iguassú, Brazil; Haseman.
- Imparfinis microps** Eigenmann and Fisher, Annals Carnegie Museum, X, 1916, 82; Memoirs Carnegie Museum, IX, 1922, 221.
Type, No. 6776, 78 mm., Rio Negro at Villavicencio, Colombia; Eigenmann.
- Imparfinis mirini** Haseman, Annals Carnegie Museum, VII, 1911, 318.
Type, No. 2981, 83 mm., Above falls of Piracicaba-mirini; Haseman.
- Leptoglanis essequibensis** Eigenmann, Memoirs Carnegie Museum, V, 1912, 158.
Type, No. 1652, 156 mm., Crab Falls, British Guiana; Eigenmann.
- Megalonema platycephalum** Eigenmann, Memoirs Carnegie Museum, V, 1912, 150.
Type, No. 1684, 173 mm., Tumatumari, British Guiana; Eigenmann.
- Megalonema xanthum** Eigenmann, Indiana University Studies, No. 16, 1912, 16.
Type, No. 4822, 202 mm., Girardot, Colombia; Eigenmann.
- Microglanis pœcilus** Eigenmann, Memoirs Carnegie Museum, V, 1912, 155.
Type, No. 1676a, 37 mm., Below Packeo Falls, British Guiana; Eigenmann.
- Myoglanis potaroënsis** Eigenmann, Memoirs Carnegie Museum, V, 1912, 159.
Type, No. 1664, 58 mm., Tukeit, British Guiana; Eigenmann.

Nannorhamdia nemacheir Eigenmann and Fisher, Annals Carnegie Museum, X, 1916, 83.

Type, No. 7125, 105 mm., Girardot, Colombia; Eigenmann.

Pimelodella avanhandavæ Eigenmann, Memoirs Carnegie Museum, VII, 1917, 240.

Type, No. 6969, 85 mm., Rio Tieté at Salto Avanhandava above fall; Haseman.

Pimelodella boliviana Eigenmann, Memoirs Carnegie Museum, VII, 1917, 245.

Type, No. 6964, 90 mm., Santa Cruz de la Sierra, Bolivia; Haseman.

Pimelodella griffini Eigenmann, Memoirs Carnegie Museum, VII, 1917, 250.

Type, No. 6962, 87 mm., mountain rills near Sapucay, Paraguay; Haseman.

Pimelodella hasemani Eigenmann, Memoirs Carnegie Museum, VII, 1917, 241.

Type, No. 6968, 81 mm., San Antonio de Rio Madeira; Haseman.

Pimelodella itapicuruensis Eigenmann, Memoirs Carnegie Museum, VII, 1917, 247.

Type, No. 6974, 80 mm., Queimadas, Rio Itapicuru; Haseman.

Pimelodella laticeps Eigenmann, Memoirs Carnegie Museum, VII, 1917, 243.

Type, No. 6957, 62 mm., Sapucay, Paraguay; Haseman.

Pimelodella laticeps australis Eigenmann, Memoirs Carnegie Museum, VII, 1917, 243.

Type, No. 6950, 75 mm., Uruguayana; Haseman.

Pimelodella macturkii Eigenmann, Memoirs Carnegie Museum, V, 1912, 170.

Type, No. 1695, 69 mm., Creek in Mora Passage, British Guiana; Eigenmann.

Pimelodella megalops Eigenmann, Memoirs Carnegie Museum, V, 1912, 169.

Type, No. 1692, 100 mm., Tumatumari, British Guiana; Eigenmann.

Pimelodella metæ Eigenmann, Memoirs Carnegie Museum, VII, 1917, 244.

Type, No. 7441, 77 mm., Rio Negro at Villavicencio, Colombia; Gonzales.

Pimelodella notomelas Eigenmann, Memoirs Carnegie Museum, VII, 1917, 244.

Type, No. 6955, 51 mm., Caceres; Haseman.

Pimelodella serrata Eigenmann, Memoirs Carnegie Museum, VII, 1917, 235.

Type, No. 6967, 67 mm., San Joaquin, Bolivia; Haseman.

Pimelodus heteropleurus Eigenmann, Memoirs Carnegie Museum, V, 1912, 176.

Type, No. 1734, 46 mm., Rupununi Pan, British Guiana; Eigenmann.

Pimelodus ortmanni Haseman, Annals Carnegie Museum, VII, 1911, 379.

Type, No. 2856, 160 mm., Porto União da Victoria, Iguassú, Brazil; Haseman.

Platysilurus barbatus Haseman, Annals Carnegie Museum, VII, 1911, 320.

Type, No. 2987, 175 mm., São Antonio de Rio Madeira; Haseman.

Pseudopimelodus albomarginatus Eigenmann, Memoirs Carnegie Museum, V, 1912, 153.

Type, No. 1680, 98 mm., Tukeit, British Guiana; Eigenmann.

Pseudopimelodus villosus Eigenmann, Memoirs Carnegie Museum, V, 1912, 152.

Type, No. 1677, 148 mm., Potaro Landing, British Guiana; Eigenmann.

Rhamdella montana Eigenmann, Annals Carnegie Museum, VIII, 1911, 421.

Type, No. 4858, 47 mm., Queta, S. E. of Tarma, Peru; Lola Vance.

Rhamdia branneri Haseman, Annals Carnegie Museum, VII, 1911, 377.

Type, No. 2851, 103 mm., Serrinha Paraná, Iguassú, Brazil; Haseman.

Rhamdia branneri voulezi Haseman, Annals Carnegie Museum, VII, 1911, 378.

Type, No. 2854, 122 mm., Porto União da Victoria, Iguassú, Brazil; Haseman.

Rhamdia microps Eigenmann, Annals Carnegie Museum, XI, 1917, 394.

Type, No. 7283, 175 mm., Uruguayana; Haseman.

Rhamdiopsis moreirai Haseman, Annals Carnegie Museum, VII, 1911, 375.

Type, No. 2849, 78 mm., Serrinha Paraná, Rio Iguassú, Brazil; Haseman.

Family BUNOCEPHALIDÆ.

Bunocephalus amaurus Eigenmann, Memoirs Carnegie Museum, V, 1912, 126.

Type, No. 1555, 69 mm., Konawaruk, British Guiana; Eigenmann.

Bunocephalus chamaizelus Eigenmann, Memoirs Carnegie Museum, V, 1912, 127.

Type, No. 1556, 36 mm., Erukin, British Guiana; Eigenmann.

Bunocephalus colombianus Eigenmann, Indiana University Studies, No. 16, 1912, 10.

Type, No. 4828, 89 mm., Raspadura, Colombia; Eigenmann.

Bunocephalus depressus Hasemann, Annals Carnegie Museum, VII, 1911, 319.

Type, No. 2984, 55 mm., Rio Machupo near San Joaquin, Bolivia; Haseman.

Xyliphius magdalenæ Eigenmann, Indiana University Studies, No. 16, 1912, 10.

Type, No. 4829, 32 mm., Girardot, Colombia; Eigenmann.

Family ASPREDINIDÆ.

Agmus lyriformis Eigenmann, Memoirs Carnegie Museum, V, 1912, 128.

Type, No. 1554, 56 mm., Gluck Island, British Guiana; Eigenmann.

Family PYGIDIIDÆ.

Ochmacanthus flabelliferus Eigenmann, Memoirs Carnegie Museum, V, 1912, 213.

Type, No. 1729, 33 mm., Konawaruk, British Guiana; Eigenmann.

Pygidium alternatum Eigenmann, Proc. Am. Philos. Soc., LVI, 1917, 700.

Type, No. 7079, 67 mm., Rio Doce; Haseman.

Pygidium banneaui Eigenmann, Indiana University Studies, No. 16, 1912, 19.

Type, No. 4815, 44 mm., Bernal Creek near Honda, Colombia; Eigenmann.

Pygidium bogotense Eigenmann, Indiana University Studies, No. 16, 1912, 18.

Type, No. 4820, 75 mm., Chapinero near Bogota, Colombia; Eigenmann.

Pygidium caliense Eigenmann, Indiana University Studies, No. 16, 1912, 18.

Type, No. 4819, 53 mm., Cali, Colombia; Eigenmann.

Pygidium chapmani Eigenmann, Indiana University Studies, No. 16, 1912, 18.

Type, No. 4817, 106 mm., Boquia, Colombia; Eigenmann.

Pygidium conradi Eigenmann, Memoirs Carnegie Museum, V, 1912, 212.

Type, No. 2212, 41 mm., Amatuk, British Guiana; Eigenmann.

Pygidium davis Haseman, Annals Carnegie Museum, VII, 1911, 380.

Type, No. 2862, 450 mm., Serrinha Paraná, Brazil; Haseman.

Pygidium dorsostriatum Eigenmann, Proc. Am. Philos. Soc., LVI, 1917, 695.

Type, No. 7093, 76 mm., Villavicencio, Colombia; Gonzales.

Pygidium gracilior Eigenmann, Memoirs Carnegie Museum, V, 1912, 213.

Type, No. 1730, 27 mm., Erukin, British Guiana; Eigenmann.

Pygidium guianensis Eigenmann, Annals Carnegie Museum, VI, 1909, 11.

Type, No. 1003, 77 mm., Aruataima Falls, Upper Potaro River, British Guiana; Eigenmann.

Pygidium hasemani Eigenmann, Indiana University Studies, No. 20, 1914, 48.

Type, No. 5238, 18 mm., Santarem, Brazil; Haseman.

Pygidium iheringi Eigenmann, Proc. Am. Philos. Soc., LVI, 1917, 697.

Type, No. 7071, 160 mm., Sapina, São Paulo, Brazil; Haseman.

Pygidium latistriatum Eigenmann, Proc. Am. Philos. Soc., LVI, 1917, 696.

Type, No. 7450, 46 mm., Quebrada de Pinchote, Santander, Colombia; Gonzales.

Pygidium paolence Eigenmann, Proc. Am. Philos. Soc., LVI, 1917, 698.

Type, No. 7081, 68 mm., Alto da Serra, Rio Tieté, São Paulo; Haseman.

Pygidium proöps parahybæ Eigenmann, Memoirs Carnegie Museum, VII, 1918, 332.

Type, No. 7598, 32 mm., São João da Barra, Rio Parahyba; Haseman.

Pygidium reinhardti Eigenmann, Proc. Am. Philos. Soc., LVI, 1917, 699.

Type, No. 7078, 65 mm., Burmier, Rio Itabira, trib. of Rio das Velhas; Haseman.

Pygidium santæ-ritæ Eigenmann, Memoirs Carnegie Museum, VII, 1918, 341.

Type, No. 7599, 24 mm., Santa Rita, Rio Preto; Haseman.

Pygidium septentrionale Behre, Annals Carnegie Museum, XVIII, 1928, 309.

Type, No. 8515, 90 mm., Salao Creek into Rio Chiriqui del Tire, Panama; Behre and Chambers.

Pygidium stellatum Eigenmann, Memoirs Carnegie Museum, VII, 1918, 308.

Type, No. 7097, 78 mm., Quebrada Sarjento, Colombia; Gonzales.

Pygidium straminium Eigenmann, Proc. Am. Philos. Soc., LVI, 1917, 694.

Type, No. 7101, 46 mm., Quebrada del Mango, Colombia; Gonzales.

Pygidium triguttatum Eigenmann, Memoirs Carnegie Museum, VII, 1918, 339.

Type, No. 7600, 36 mm., Jacarehy; Haseman.

Pygidium vermiculatum Eigenmann, Proc. Am. Philos. Soc., LVI, 1917, 699.

Type, No. 7074, 131 mm., Juiz de Fora, Brazil; Ribeiro.

Pygidium zonatum Eigenmann, Memoirs Carnegie Museum, VII, 1918, 330.

Type, No. 7596, 62 mm., Agua Quente; Haseman.

Scleronema operculatum Eigenmann, Proc. Am. Philos. Soc., LVI, 1917, 691; Memoirs Carnegie Museum, VII, 1918, 281.

Type, No. 7077, 79 mm., Cacequy, Uruguay Basin; Haseman.

Vandellia hasemani Eigenmann, Memoirs Carnegie Museum, VII, 1918, 363.

Type, No. 7542, 72 mm., Rio Mamoré; Haseman.

Vandellia sanguinea Eigenmann, Proc. Am. Philos. Soc., LVI, 1917, 701.

Type, No. 7082, 62 mm., San Antonio de Rio Madeira; Haseman.

Family CETOPSIDÆ.

Hemicetopsis amphioxus Eigenmann, Indiana University Studies, No. 19, 1914, 14.

Type, No. 5332, 88 mm., San Lorenzo, Patia Basin, Colombia; Henn and Wilson.

Hemicetopsis macilentus Eigenmann, Memoirs Carnegie Museum, V, 1912, 211.

Type, No. 1726, 55 mm., Creek below Potaro landing, British Guiana; Eigenmann.

Hemicetopsis minutus Eigenmann, Memoirs Carnegie Museum, V, 1912, 211.

Type, No. 1728, 22 mm., Amatuk, British Guiana; Eigenmann.

Hemicetopsis othonops Eigenmann, Indiana University Studies, No. 16, 1912, 17.

Type, No. 4830, 120 mm., Girardot, Colombia; Eigenmann.

Family ASTROBLEPIDÆ (Argidæ).

Astroblepus cyclopus santanderensis Eigenmann, Proc. Amer. Philos. Soc., LVI, 1917, 675.

Type not designated, first specimen mentioned, No. 7430, 33 mm., Quebrada de Guapota, Prov. of Santander, Colombia, may be so considered.

Astroblepus frenatus Eigenmann, Proc. Am. Philos. Soc., LVI, 1917, 676.

Type, No. 7380, female, 43 mm., Quebrada de San Joaquin, Santander, Colombia; Gonzales.

Astroblepus grixalvii microscens Eigenmann, Proc. Amer. Philos. Soc., LVI, 1917, 677 = *Astroblepus microscens*.

Type, No. 7372, 69 mm., Quebrada de Agua Larga, Santander, Colombia; Gonzales.

Astroblepus latidens Eigenmann, Proc. Amer. Philos. Soc., LVI, 1917, 674.

Type, No. 7362, female, 57 mm., Piperel, Colombia; Gonzales.

Cyclopium chapmani Eigenmann, Indiana University Studies, No. 16, 1912, 13 = *Astroblepus chapmani*.

Type, No. 4863, 75 mm., Boquia, Colombia; Eigenmann.

Cyclopium trifasciatum Eigenmann, Indiana University Studies, No. 16, 1912, 14 = *Astroblepus trifasciatus*.

Type, No. 4868, 85 mm., Caldas, Colombia; Eigenmann.

Cyclopium unifasciatum Eigenmann, Indiana University Studies, No. 16, 1912, 15 = *Astroblepus unifasciatus*.

Type, No. 4871, 57 mm., Caldas, Colombia; Eigenmann.

Cyclopium vanceæ Eigenmann, Annals Carnegie Museum, VIII, 1911, 421 = *Astroblepus vanceæ*.

Type, No. 4856, 76 mm., Queta, S. E. of Tarma, Peru; Lola Vance.

- Cyclopium ventrale** Eigenmann, Indiana University Studies, No. 16, 1912, 15 = *Astroblepus cyclopus cirratus* (Regan).
Type, No. 4866, 76 mm., Caldas, Colombia; Eigenmann.

Family CALLICHTHYIDÆ.

- Cascadura maculocephala** Mrs. Ellis, Annals Carnegie Museum, VIII, 1911, 387.

Type, No. 3539, 66 mm., Uruguayana; Haseman.

- Chænothorax eigenmanni** Ellis, Annals Carnegie Museum, VIII, 1911, 393.

Type, No. 3542, 51 mm., Caceres; Haseman.

- Hoplosternum magdalenæ** Eigenmann, Annals Carnegie Museum, VIII, 1911, 412.

Type, No. 5081, 107 mm., Soplaviento, Colombia; Eigenmann.

Family LORICARIIDÆ.

- Acestridium discus** Haseman, Annals Carnegie Museum, VII, 1911, 319.

Type, No. 2985, 72 mm., Igarapé de Cachoeira Grande, near Manaos, Brazil; Haseman.

- Ancistrus lithurgicus** Eigenmann, Memoirs Carnegie Museum, V, 1912, 241.

Type, No. 1524, 95 mm., Crab Falls, British Guiana; Eigenmann.

- Ancistrus melas** Eigenmann, Annals Carnegie Museum, X, 1916, 83.

Type, No. 7335, 106 mm., Condoto, Colombia; C. E. Wilson.

- Corymbophanes andersoni** Eigenmann, Annals Carnegie Museum, VI, 1909, 5.

Type, No. 1001, 86 mm., Aruataima Falls, Upper Potaro River, British Guiana; Eigenmann.

- Farlowella azygia** Eigenmann and Vance, Annals Carnegie Museum, XI, 1917, 299.

Type, No. 3782, 79 mm., Santarem; Haseman.

- Farlowella hasemani** Eigenmann and Vance, Annals Carnegie Museum, XI, 1917, 301.

Type, No. 3781, 165 mm., Para, Brazil; Haseman.

- Farlowella jauruënsis** Eigenmann and Vance, Annals Carnegie Museum, XI, 1917, 300.

Type, No. 3780, 133 mm., Jauru; Haseman.

- Hemiancistrus daguæ** Eigenmann, Indiana University Studies, No. 16, 1912, 11.

Type, No. 4842, 79 mm., Caldas, Colombia; Eigenmann.

- Hemiancistrus mayoloi** Eigenmann, Indiana University Studies, No. 16, 1912, 10.
Type, No. 4826, 125 mm., Istmina, Colombia; Eigenmann.
- Lasiancistrus caucanus** Eigenmann, Indiana University Studies, No. 16, 1912, 11.
Type, No. 4824, 171 mm., Cartago, Colombia; Eigenmann.
- Lithogenes villosus** Eigenmann, Annals Carnegie Museum, VI, 1909, 6.
Type, No. 1002, 44 mm., Aruataima Falls, Upper Potaro River, British Guiana; Eigenmann.
- Lithoxus lithoides** Eigenmann, Memoirs Carnegie Museum, V, 1912, 242.
Type, No. 1527, 86 mm., Amatuk, British Guiana; Eigenmann.
- Loricaria filamentosa latiura** Eigenmann and Vance, Indiana University Studies, No. 16, 1912, 13.
Type, No. 3806, particular specimen not designated, Boca de Certegui, Colombia; Eigenmann.
- Loricaria filamentosa seminuda** Eigenmann and Vance, Indiana University Studies, No. 16, 1912, 13.
Type, No. 3807, 182 mm., to base of caudal, Girardot, Colombia; Eigenmann.
- Loricaria fimbriata** Eigenmann and Vance, Indiana University Studies, No. 16, 1912, 12.
Type, No. 3808, 114 mm., Boca de Certegai, Colombia; Eigenmann.
- Loricaria griseus** Eigenmann, Annals Carnegie Museum, VI, 1909, 8.
Type, No. 1504, 131 mm., Konawaruk, British Guiana; Eigenmann.
- Loricaria microdon** Eigenmann, Annals Carnegie Museum, VI, 1909, 7.
Type, No. 1507, 90 mm., Rupununi, British Guiana; Eigenmann.
- Loricaria stewarti** Eigenmann, Annals Carnegie Museum, VI, 1909, 9.
Type, No. 1508, 81 mm., Chipoo Creek, British Guiana; Eigenmann.
- Loricaria submarginatus** Eigenmann, Annals Carnegie Museum, VI, 1909, 10.
Type, No. 1510, 142 mm., Creek below Potaro Landing, British Guiana; Eigenmann.
- Plecostomus derbyi** Haseman, Annals Carnegie Museum, VII, 1911, 384.
Type, No. 2865, 95 mm., Porto União da Victoria, Brazil; Haseman.

Plecostomus hemiurus Eigenmann, Memoirs Carnegie Museum, V, 1912, 224.

Type, No. 1544, 201 mm., Amatuk, British Guiana; Eigenmann.

Pseudancistrus carnegiei Eigenmann, Annals Carnegie Museum, X, 1916, 85.

Type, No. 7346, 110 mm., Rio San Gil, Santander, Colombia; Gonzales.

Pseudancistrus nigrescens Eigenmann, Memoirs Carnegie Museum, V, 1912, 234.

Type, No. 1539, 182 mm., Amatuk, British Guiana; Eigenmann.

Pseudancistrus pediculatus Eigenmann, Proc. Amer. Philos. Soc., LVI, 1917, 679.

Type, No. 7348, 118 mm., Rio Negro, Villavicencio, Colombia; Gonzales.

Order INIOMI.

Family MYCTOPHIDÆ.

Dasyscopelus orientalis Gilbert, Memoirs Carnegie Museum, VI, 1913, 70.

Type, No. 4613, 67 mm., Misaki, Sagami Bay, Japan; Allan Owston.

Diaphus gigas Gilbert, Memoirs Carnegie Museum, VI, 1913, 93.

Type, No. 4601, 172 mm., (total length), Sagami Bay, Japan; Owston.

Diaphus latus Gilbert, Memoirs Carnegie Museum, VI, 1913, 95.

Type, No. 4604, 75 mm., Sagami Bay, Japan; Owston.

Diaphus sagamiensis Gilbert, Memoirs Carnegie Museum, VI, 1913, 96.

Type, No. 4608, 67 mm., Sagami Bay, Japan; Owston.

Lampanyctus jordani Gilbert, Memoirs Carnegie Museum, VI, 1913, 104.

Type, No. 4617, 121 mm., Nemuro, Hokkaido, Japan; D. S. Jordan.

Myctophum hollandi Jordan and Jordan, Memoirs Carnegie Museum, X, 1922, 11.

Type, No. 3897, 4.25 inches, Honolulu market, Hawaii; Grinnell.

Order **CYPRINODONTES** (Microcyprini).Family **CYPRINODONTIDÆ**.

Rivulus breviceps Eigenmann, Annals Carnegie Museum, VI, 1909, 49.
Type, No. 1075, 50 mm., Shrimp Creek, British Guiana; Eigenmann.

Rivulus compressus Henn, Annals Carnegie Museum, X, 1916, 111.
Type, No. 5819, 55 mm., Manaos, Brazil; Haseman.

Rivulus frenatus Eigenmann, Annals Carnegie Museum, VI, 1909, 51.
Type, No. 1085, 28 mm., Gluck Island, Essequibo River, British Guiana; Eigenmann.

Rivulus holmiæ Eigenmann, Annals Carnegie Museum, VI, 1909, 50;
Type, No. 1076, 77 mm., Creek near Holmia, British Guiana; Eigenmann.

Rivulus lanceolatus Eigenmann, Annals Carnegie Museum, VI, 1909, 51.
Type, No. 1084, 42.5 mm., Rockstone, British Guiana; Eigenmann.

Rivulus magdalenæ Eigenmann and Henn, Annals Carnegie Museum, X, 1916, 109.
Type, No. 5813, 56 mm., Ibagué, Colombia; Eigenmann.

Rivulus stagnatus Eigenmann, Annals Carnegie Museum, VI, 1909, 50.
Type, No. 1082, 44 mm., Christianburg, British Guiana; Eigenmann.

Rivulus waimacui Eigenmann, Annals Carnegie Museum, VI, 1909, 50.
Type, No. 1078, 79 mm., Shrimp Creek, British Guiana; Eigenmann.

Family **PÆCILIIDÆ**.

Acanthophaecelus bifurcus Eigenmann, Annals Carnegie Museum, VI, 1909, 52 = *Pæcilia paræ* Eigenmann.
Type, No. 1088, 22 mm., Christianburg, British Guiana; Eigenmann.

Acanthophaecelus melanzonus Eigenmann, Annals Carnegie Museum, VI, 1909, 51 = *Pæcilia melanzona* (Eigenmann).
Type, No. 1086, 27 mm., Georgetown Trenches, British Guiana; Eigenmann.

Cnesterodon carnegiei Haseman, Annals Carnegie Museum, VII, 1911, 385 = *Cnesterodon decem-maculatus* (Jenyns).

Type, No. 2868, female, 40 mm., Serrinha Paraná, Rio Iguassú, Brazil; Haseman.

Gambusia caliensis Eigenmann and Henn, Annals Carnegie Museum, X, 1916, 113.

Type, No. 6700, female, 34 mm., Cali, Colombia; Eigenmann.

Gambusia nigroventralis Eigenmann and Henn, Indiana University Studies, No. 16, 1912, 26 = *Priapichthys nigroventralis*.

Type, No. 4835, female, 26 mm., Isthmina, Colombia; Eigenmann.

Heterandria colombianus Eigenmann and Henn, Indiana University Studies, No. 16, 1912, 27 = *Pæciliopsis colombiana*.

Type, No. 4837, female, 64 mm., Rio Dagua, Colombia; Eigenmann.

Heterandria hasemani Henn, Annals Carnegie Museum, X, 1916, 116.

Type, No. 4663, 20 mm., Puerto Suarez, Bolivia; Haseman.

Limia hollandi Henn, Annals Carnegie Museum, X, 1916, 138.

Type, No. 4634, female, 34 mm., Lagoa Barreiras, Rio San Francisco; Haseman.

Neoheterandria elegans Henn, Annals Carnegie Museum, X, 1916, 118.

Type, No. 5823, male, 16.5 mm., Truando, Colombia; Wilson.

Phalloptychus eigenmanni Henn, Annals Carnegie Museum, X, 1916, 121.

Type, No. 4665, female, 29 mm., Alagoinhas, Rio Catu, Bahia, Brazil; J. D. Haseman.

Phallotorynus fasciolatus Henn, Annals Carnegie Museum, X, 1916, 129.

Type, No. 3752, male, 20 mm., Jacarehy, São Paulo, Brazil; Haseman.

Tomeurus gracilis Eigenmann, Annals Carnegie Museum, VI, 1909, 53.

Type, No. 1093, 31 mm., Mud Creek in Aruka River, British Guiana; Eigenmann.

Family FITZROYIIDÆ.

Fitzroyia eigenmanni Haseman, Annals Carnegie Museum, VII, 1911, 385.

Type, No. 2866, female, 43 mm., Serrinha Paraná, Rio Iguassú, Brazil; Haseman.

Order **ANACANTHINI.**Family **MACROURIDÆ.**

Cœlorhynchus gilberti Jordan and Hubbs, Memoirs Carnegie Museum, X, 1925, 327.

Type, No. 7960, 462 mm., to tip of tail, market at Shizuoka, Japan; Jordan.

Coryphænoides bona-nox Jordan and Thompson, Memoirs Carnegie Museum, VI, 1914, 305.

Type, No. 6462, 300 mm., Sagami Bay, Japan; Jordan.

Family **GADIDÆ.**

Physiculus grinnelli Jordan and Jordan, Memoirs Carnegie Museum, X, 1922, 22.

Type, No. 3898, 12.5 inches, Honolulu market, Hawaii; D. S. Jordan.

Order **HETEROSOMATA.**Family **SOLEIDÆ.**

Areliscus hollandi Jordan and Metz, Memoirs Carnegie Museum, VI, 1913, 62.

Type, No. 4369, 365 mm., Fusan, Korea; Jordan.

Soleonasus finis Eigenmann, Memoirs Carnegie Museum, V, 1912, 528.

Type, No. 2487, 80 mm., Tumatumari, British Guiana; Eigenmann.

Order **THORACOSTEI.**Family **SOLENOSTOMIDÆ.**

Solenostomus pægnius Jordan and Thompson, Memoirs Carnegie Museum, VI, 1914, 235.

Type, No. 6020, 101 mm., Misaki, Japan; Jordan.

Family **SYNGNATHIDÆ.**

Siphostoma eigenmanni Wilson, Annals Carnegie Museum, X, 1916, 60.

Type, No. 5672, 121 mm., Rio Vermelho, Bahia, Brazil; Hase-man.

Order **AULOSTOMI.**Family **CENTRISCIDÆ.**

Centriscus capito Oshima, Annals Carnegie Museum, XIII, 1922, 263.

Type, No. 8287, 108 mm., Tôkô, Formosa; A. Kihara.

Order **LABYRINTHICI**.

Family **OSPHRONEMIDÆ**.

Macropodus filamentosus Oshima, Annals Carnegie Museum, XII, 1919, 278.

Type, No. 8261, 43 mm., Kotosho (Botel Tobago Island) Formosa; Kikuchi.

Order **PERCOMORPHI**.

SUBORDER *PERCESOCES*.

Family **MUGILIDÆ**.

Joturus daguæ Eigenmann, Proc. Amer. Philos. Soc., LVI, 1917, 681.

Type, No. 7458, 195 mm., Rio Dagua at Caldas, Colombia; Eigenmann.

Liza formosæ Oshima, Annals Carnegie Museum, XIII, 1922, 251.

Type, No. 8283, 126 mm., Anpin, Formosa; M. Watanabe.

Liza parva Oshima, Annals Carnegie Museum, XIII, 1922, 253.

Type, No. 8284, 70 mm., Anpin, Formosa; Watanabe.

Liza pescadorensis Oshima, Annals Carnegie Museum, XIII, 1922, 254.

Type, No. 8285, 275 mm., Bakô Pescadores Is., Formosa; Oshima.

Mugil anpinensis Oshima, Annals Carnegie Museum, XIII, 1922, 245.

Type, No. 8281, 192 mm., Anpin, Formosa; Oshima.

SUBORDER *RHEGNOPTERI*.

SERIES **SCOMBRIFORMES**.

Family **SCOMBRIDÆ**.

Pneumatophorus peruanus Jordan and Hubbs, Memoirs Carnegie Museum, X, 1925, 211.

Type, No. 7847, 201 mm., Callao, Peru; Admiral L. A. Beardslee.

Family **GEMPYLIDÆ**.

Diplogonurus maderensis Noronha, Annals Carnegie Museum, XVI, 1926, 381.

Type, no particular specimen was designated and no part whatever of this species was received at the Carnegie Museum.

SERIES **BRAMIFORMES**.

Family **BRAMIDÆ**.

Eumegistus illustris Jordan and Jordan, Memoirs Carnegie Museum, X, 1922, 36.

Type, No. 3899, 24 inches, partly dissected, Honolulu market, Hawaii; Jordan.

SERIES STROMATEIFORMES.

Family CENTROLOPHIDÆ.

Ectenias brunneus Jordan and Thompson, Memoirs Carnegie Museum, VI, 1914, 241.

Type, No. 6453, 100 mm., Misaki, Japan; Jordan.

Family NOMEIDÆ.

Icticus ischanus Jordan and Thompson, Memoirs Carnegie Museum, VI, 1914, 242.

Type, No. 6036, 245 mm., Okinawa, Riu-kiu Islands, Japan; Jordan.

SERIES CARANGIFORMES.

Family CARANGIDÆ.

Alectis breviventralis Wakiya, Annals Carnegie Museum, XV, 1924, 216.

Type, No. 7753, 116 mm., Prov. of Kii, Japan; Wakiya.

Alectis temmincki Wakiya, Annals Carnegie Museum, XV, 1924, 215.

Type, No. 7752, 120 mm., Bonin Islands, Japan; Wakiya.

Caranx formosanus Jordan and Snyder, Memoirs Carnegie Museum, IV, 1909, 38.

Type, No. 412, 11.5 inches; Takao, Formosa; Hans Sauter.

Caranx ishikawai Wakiya, Annals Carnegie Museum, XV, 1924, 193.

Type, No. 7734, 323 mm., Bonin Islands, Japan; Wakiya.

Caranx (Atule) **miyakamii** Wakiya, Annals Carnegie Museum, XV, 1924, 201.

Type, No. 7742, 119 mm., Formosa; Wakiya.

Caranx oshimai Wakiya, Annals Carnegie Museum, XV, 1924, 189.

Type, No. 7731, 123 mm., Formosa; Wakiya.

Caranx rastrosus Jordan and Snyder, Memoirs Carnegie Museum, IV, 1909, 37.

Type, No. 411, 13.5 inches, Takao, Formosa; Sauter.

Carnax (*Citula*) **uii** Wakiya, Annals Carnegie Museum, XV, 1924, 174.

Type, No. 7720, 125 mm., Kii, Japan; Wakiya.

Decapterus dayi Wakiya, Annals Carnegie Museum, XV, 1924, 158.

Type, No. 7711, 140 mm., Formosa; Wakiya.

Scomberoides formosanus Wakiya, Annals Carnegie Museum, XV, 1924, 236.

Type, No. 7765, 130 mm., Prov. of Kii, Japan; Wakiya.

Trachynotus jordani Wakiya, Annals Carnegie Museum, XV, 1924, 221.

Type, No. 7756, 297 mm., Bonin Islands, Japan; Wakiya.

Ulua richardsoni Jordan and Snyder, Memoirs Carnegie Museum, IV, 1909, 39.

Type, No. 413, 18 inches, Takao, Formosa; Hans Sauter.

Family LEIOGNATHIDÆ.

Gazza achlamys Jordan and Starks, Annals Carnegie Museum, XI, 1917, 446.

Type, No. 8074, 5.5 inches, Colombo, Ceylon.

SERIES KURTIFORMES.

Family APOGONIDÆ.

Amia sialis Jordan and Thompson, Memoirs Carnegie Museum, VI, 1914, 246.

Type, No. 6021, 123 mm., Suruga Gulf, Japan; Jordan.

Apogonichthys melampodus Blosser, Annals Carnegie Museum, VI, 1909, 296.

Type, No. 1474, 35 mm., St. Croix, Danish West Indies; Eigenmann.

Scepterias fragilis Jordan and Jordan, Memoirs Carnegie Museum, X, 1922, 45.

Type, No. 3900, 4.6 inches, Honolulu market, Hawaii; D. S. Jordan.

Family OLIGORIDÆ.

Malakichthys wakiyæ Jordan and Hubbs, Memoirs Carnegie Museum, X, 1925, 233.

Type, No. 7863, 119 mm., to caudal, Kagoshima Bay, Japan; Wakiya.

Family EPINEPHELIDÆ.

Bodianus stellatus Blosser, Annals Carnegie Museum, VI, 1909, 297.

Type, No. 1473, 193 mm., St. Croix, Danish West Indies; Eigenmann.

Cephalopholis boninius Jordan and Thompson, Memoirs Carnegie Museum, VI, 1914, 248.

Type, No. 6038, 180 mm., Bonin Islands, Japan; Jordan.

Epinephelus ionthas Jordan and Metz, Memoirs Carnegie Museum, VI, 1913, 32.

Type, No. 4559, 14 inches, Fusan, Korea; Jordan.

Family SERRANIDÆ.

Entonanthias pascalus Jordan and Tanaka, Annals Carnegie Museum, XVII, 1927, 385.

Type, No. 8327, 147 mm., Naha, Okinawa, Japan; Tanaka.

Franzia ardens Jordan and Thompson, Memoirs Carnegie Museum, VI, 1914, 251.

Type, No. 6451, 93 mm., Misaki, Japan; Jordan.

Family PEMPHERIDÆ.

Liopempheris sasakii Jordan and Hubbs, Memoirs Carnegie Museum, X, 1925, 228.

Type, No. 7860, 97 mm. to caudal fin, Toba market, Japan; Jordan and Yamamoto.

Family POMADASIDÆ.

Scolopsis eriomma Jordan and Richardson, Memoirs Carnegie Museum, IV, 1909, 188.

Type, No. 317, Takao, Formosa; Sauter.

Family SCIÆNIDÆ.

Pseudotolithus brunneolus Jordan and Richardson, Memoirs Carnegie Museum, IV, 1909, 191.

Type, No. 327, 8 inches, Takao, Formosa; Sauter.

Sciæna iharæ Jordan and Metz, Memoirs Carnegie Museum, VI, 1913, 37.

Type, No. 4371, 300 mm., Fusan, Korea; Jordan.

Stellifer melanocheir Eigenmann, Proc. Amer. Philos. Soc., LVI, 1917, 682; Memoirs Carnegie Museum, IX, 1922, 190.

Type, No. 7520, 120 mm., Tumaco, Colombia; Henn and Wilson.

Umbrina tumacöensis Wilson, Annals Carnegie Museum, X, 1916, 67.

Type, No. 5654, 163 mm., Tumaco, Colombia; Henn and Wilson.

SERIES CHÆTODONTIFORMES.

Family CHÆTODONTIDÆ.

Centropyge tutuilæ Jordan and Jordan, Memoirs Carnegie Museum, X, 1922, 62.

Type, No. 3902, 3 inches, Pago Pago, Tutuila, Samoa; Jordan and Kellogg.

Holacanthus lunatus Blosser, Annals Carnegie Museum, VI, 1909, 299.

Type, No. 1235, 19 mm., St. Croix, Danish West Indies; Eigenmann.

Order **CATAPHRACTI.**

SERIES SCORPAENIFORMES.

Family SCORPÆNIDÆ.

Brachirus bellus Jordan and Hubbs, Memoirs Carnegie Museum, X, 1925, 274.

Type, No. 7894, 90 mm. to end of caudal, Misaki, Japan; Aoki.

Sebastodes clavilatus Starks, Annals Carnegie Museum, VII, 1911, 181.

Type, No. 548, 150 mm., San Juan Islands, Washington; Starks.

Sebastodes deani Starks, Annals Carnegie Museum, VII, 1911, 178.

Type, No. 545, 207 mm., San Juan Islands, Washington; Starks.

Sebastodes emphæus Starks, Annals Carnegie Museum, VII, 1911, 182.

Type, No. 549, San Juan Islands, Washington; Starks.

Sebastodes iijimæ Jordan and Metz, Memoirs Carnegie Museum, VI, 1913, 49.

Type, No. 4172, 160 mm., Fusan, Korea; Jordan.

Sebastodes owstoni Jordan and Thompson, Memoirs Carnegie Museum, VI, 1914, 270.

Type, No. 6026, 178 mm., Aomori, Japan; Jordan.

Thysanichthys evides Jordan and Thompson, Memoirs Carnegie Museum, VI, 1914, 272.

Type, No. 6019, 95 mm., Misaki, Japan; Jordan.

SERIES HEXAGRAMMIFORMES.

Family HEXAGRAMMIDÆ.

Pleurogrammus azonus Jordan and Metz, Memoirs Carnegie Museum, VI, 1913, 47.

Type, No. 4558, 14 inches, Chinnampo, Korea; Jordan.

Stellistius katsukii Jordan and Tanaka, Annals Carnegie Museum, XVII, 1927, 389.

Type, No. 8329, 179 mm., Off Mororan, Hokkaido, Japan; Katsuki.

SERIES COTTIFORMES.

Family AGONIDÆ.

Iburiella kasawæ Jordan and Hubbs, Memoirs Carnegie Museum, X, 1925, 291.

Type, No. 7906, 133 mm., Tomakomai, near Morroran, Japan; Snyder and Sindo.

SERIES CYCLOPTERIFORMES.

Family LIPARIDÆ.

Careproctus burkei Jordan and Thompson, Memoirs Carnegie Museum, VI, 1914, 281.

Type, No. 6457, 92 mm., Yokahama Market, Japan; Jordan.

Careproctus gilberti Jordan and Thompson, Memoirs Carnegie Museum, VI, 1914, 282.

Type, No. 6456, 160 mm., Misaki, Sagami Bay, Japan; Jordan.

SERIES TRIGLIFORMES.

Family TRIGLIDÆ.

Chelidonichthys ischyryus Jordan and Thompson, Memoirs Carnegie Museum, VI, 1914, 282.

Type, No. 6459, 150 mm., Sagami Bay, Japan; Owston.

Order CHROMIDES.

Family POMACENTRIDÆ.

Chromis villadolidi Jordan and Tanaka, Annals Carnegie Museum, XVII, 1927, 387.

Type, No. 8328, 134 mm., Sea of Japan between Tsushima and Fukuoka, Kiusiu, Japan; Tanaka.

Family CICHLIDÆ.

Æquidens awani Haseman, Annals Carnegie Museum, VII, 1911, 335.

Type, No. 2576, 145 mm., São Antonio de Guaporé; Haseman.

Æquidens duopunctata Haseman, Annals Carnegie Museum, VII, 1911, 338.

Type, No. 2573, 95 mm., Manaos, Brazil; Haseman.

Æquidens guaporensis Haseman, Annals Carnegie Museum, VII, 1911, 335.

Type, No. 2575, 54 mm., São Antonio de Guaporé; Haseman.

Æquidens potaroënsis Eigenmann, Memoirs Carnegie Museum, V, 1912, 490.

Type, No. 2407, 140 mm., Amatuk, British Guiana; Eigenmann.

Astronotus orbiculatus Haseman, Annals Carnegie Museum, VII, 1911, 331.

Type, No. 2515, 135 mm., Santarem; Haseman.

Crenicara altispinosa Haseman, Annals Carnegie Museum, VII, 1911, 344.

Type, No. 2439, 50 mm., Rio Mamoré, below mouth of Rio Guaporé; Haseman.

Crenicichla alta Eigenmann, Memoirs Carnegie Museum, V, 1912, 516.

Type, No. 2274, 169 mm., Gluck Island, British Guiana; Eigenmann.

Crenicichla dorsocellata Haseman, Annals Carnegie Museum, VII, 1911, 355.

Type, No. 2721, 180 mm., Campos, Rio Parahyba, Brazil; Haseman.

Crenicichla iguassuënsis Haseman, Annals Carnegie Museum, VII, 1911, 352.

Type, No. 2725, 140 mm., Porto União da Victoria, Rio Iguassú; Haseman.

Crenicichla jaguarensis Haseman, Annals Carnegie Museum, VII, 1911, 351.

Type, No. 2723, 52 mm., Jaguará, Rio Grande of the Parana; Haseman.

Crenicichla santaremensis Haseman, Annals Carnegie Museum, VII, 1911, 354.

Type, No. 2719, 98 mm., Santarem, Brazil; Haseman.

Crenicichla simoni Haseman, Annals Carnegie Museum, VII, 1911, 345.

Type, No. 2646, 75 mm., Sao Luiz de Cáceres; Haseman.

Cichlasoma ornatum gephyrum Eigenmann, Memoirs Carnegie Museum, IX, 1922, 205.

Type, No. 7639a, 240 mm., Córdova, Rio Dagua, Colombia; Eigenmann.

Geophagus brasiliensis iporangensis Haseman, Annals Carnegie Museum, VII, 1911, 364.

Type, No. 2792, 87 mm., Iporanga; Haseman.

Geophagus brasiliensis itapicuruënsis Haseman, Annals Carnegie Museum, VII, 1911, 365.

Type, No. 2793, 113 mm., Queimadas, Rio Itapicuru; Haseman.

Heterogramma ortmanni Eigenmann, Memoirs Carnegie Museum, V, 1912, 506.

Type, No. 2306, 64 mm., Erukin, British Guiana; Eigenmann.

Heterogramma ritense Haseman, Annals Carnegie Museum, VII, 1911, 362.

Type, No. 2765, Santa Rita, Rio Santa Rita, Paraguay Basin; Haseman.

Heterogramma tæniatum pertense Haseman, Annals Carnegie Museum, VII, 1911, 359.

Type, No. 2741, 27 mm., Manaos, Brazil; Haseman.

Heterogramma trifasciatum maciliense Haseman, Annals Carnegie Museum, VII, 1911, 360.

Type, No. 2751, São Antonio de Guaporé; Haseman.

Nannacara bimaculata Eigenmann, Memoirs Carnegie Museum, V, 1912, 488.

Type, No. 2304, 50 mm., Erukin, British Guiana; Eigenmann.

Order PHARYNGOGNATHI.

Family CORIDÆ.

Hemipteronotus evides Jordan and Richardson, Memoirs Carnegie Museum, IV, 1909, 196.

Type, No. 343, Takao, Formosa; Sauter.

Iridio bimaculata Wilson, Annals Carnegie Museum, X, 1916, 68.

Type, No. 5280, 170 mm., Rio Dagua at Buenaventura, Colombia; Eigenmann.

Xyrichthys sciistius Jordan and Thompson, Memoirs Carnegie Museum, VI, 1914, 263.

Type, No. 6028, 165 mm., Sagami Bay, Japan; Jordan.

Order GOBIOIDEA.

Family ELEOTRIDÆ.

Dormitator gymnocephalus Eigenmann, Memoirs Carnegie Museum, V, 1912, 523.

Type, No. 2438, 18 mm., Konawaruk, British Guiana; Eigenmann.

Encæura evides Jordan and Hubbs, Memoirs Carnegie Museum, X, 1925, 303.

Type, No. 7931, 42 mm., to caudal, Wakanoura, Japan; Yamamoto.

Family GOBIIDÆ.

Awaous decemlineatus Eigenmann, Proc. Amer. Philos. Soc., LVI, 1917, 686.

Type, No. 7478, 80 mm., Quibdo, Colombia; Eigenmann.

Glossogobius abacopus Jordan and Richardson, Memoirs Carnegie Museum, IV, 1909, 200.

Type, No. 357, 2.5 inches, Takao, Formosa; Sauter.

Glossogobius parvus Oshima, Annals Carnegie Museum, XII, 1919, 305.

Type, No. 8276, 44 mm., Kizanto, Giran, Formosa; Aoki.

Gobius (Ctenogobius) daguæ Eigenmann, Proc. Amer. Philos. Soc., LVI, 1917, 685.

Type, No. 7481, 133 mm., Mouth of Rio Dagua, Colombia; Eigenmann.

Rhinogobius formosanus Oshima, Annals Carnegie Museum, XII, 1919, 300.

Type, No. 8273, 65 mm., Shinchiku, Formosa; Aoki.

Rhinogobius taiwanus Oshima, Annals Carnegie Museum, XII, 1919, 298.

Type, No. 8272, 69 mm., Shinchiku, Formosa; Aoki.

Sicydium hildebrandi Eigenmann, Proc. Amer. Philos. Soc., LVI, 1917, 685.

Type, No. 7466, 137 mm., Cisnero, Rio Dagua, Colombia; Eigenmann.

Tænioides snyderi Jordan and Hubbs, Memoirs Carnegie Museum, X, 1925, 310.

Type, No. 7941, not indicated as the type, but may be so considered, Wakanoura, Japan; Jordan and Snyder.

Tridentiger kuroiwæ Jordan and Tanaka, Annals Carnegie Museum, XVII, 1927, 276.

Type, No. 8324, 115 mm., Yakkachi River, Amami-Oshima; Tanaka.

Order JUGULARES.

Family CALLIONYMIDÆ.

Calliurichthys astrinius Jordan and Jordan, Memoirs Carnegie Museum, X, 1922, 80.

Type, No. 3903, 6 inches, Honolulu market, Hawaii; Jordan.

Calliurichthys zanectes Jordan and Jordan, Memoirs Carnegie Museum, X, 1922, 81.

Type, No. 3904, 10.5 inches, Honolulu market, Hawaii; Jordan.

Calymmichthys xenicus Jordan and Thompson, Memoirs Carnegie Museum, VI, 1914, 296.

Type, No. 6027, 135 mm., Sagami Bay, Japan; Jordan.

Synchiropus ijimæ Jordan and Thompson, Memoirs Carnegie Museum, VI, 1914, 295.

Type, No. 6015, 65 mm., Misaki, Japan; Jordan.

Family URANOSCOPIDÆ.

Zalescopus satsumæ Jordan and Hubbs, Memoirs Carnegie Museum, X, 1925, 313.

Type, No. 7949, 166 mm., to caudal, Kagoshima Bay, Prov. of Satsuma, Japan; Wakiya.

Zalescopus tosæ Jordan and Hubbs, Memoirs Carnegie Museum, X, 1925, 312.

Type, No. 7945, 138 mm., to caudal base, Kochi in Tosa, Shikoku, Japan; Wakiya.

Family ZOARCIDÆ (Lycodidæ):

Allolepis hollandi Jordan and Hubbs, Memoirs Carnegie Museum, X, 1925, 323.

Type, No. 7952, 322 mm., to caudal, Fukui on Sea of Japan; Nonaka.

Lycodes tanakæ Jordan and Thompson, Memoirs Carnegie Museum, VI, 1914, 299.

Type, No. 6004, 460 mm., Noto in Hondo, Japan; Jordan.

Zestichthys tanakæ Jordan and Hubbs, Memoirs Carnegie Museum, X, 1925, 321.

Type, No. 7951, 490 mm., to caudal, Kushiro, Japan; Tanaka.

Family BROTLIDÆ.

Monomitopus kumæ Jordan and Hubbs, Memoirs Carnegie Museum, X, 1925, 324.

Type, No. 7954, 363 mm., to caudal, Misaki, Japan; Aoki.

Spectrunculus radcliffei Jordan and Thompson, Memoirs Carnegie Museum, VI, 1914, 301.

Type, No. 6061, 64 mm., Misaki, Japan; Jordan.

Family BATRACHOIDIDÆ.

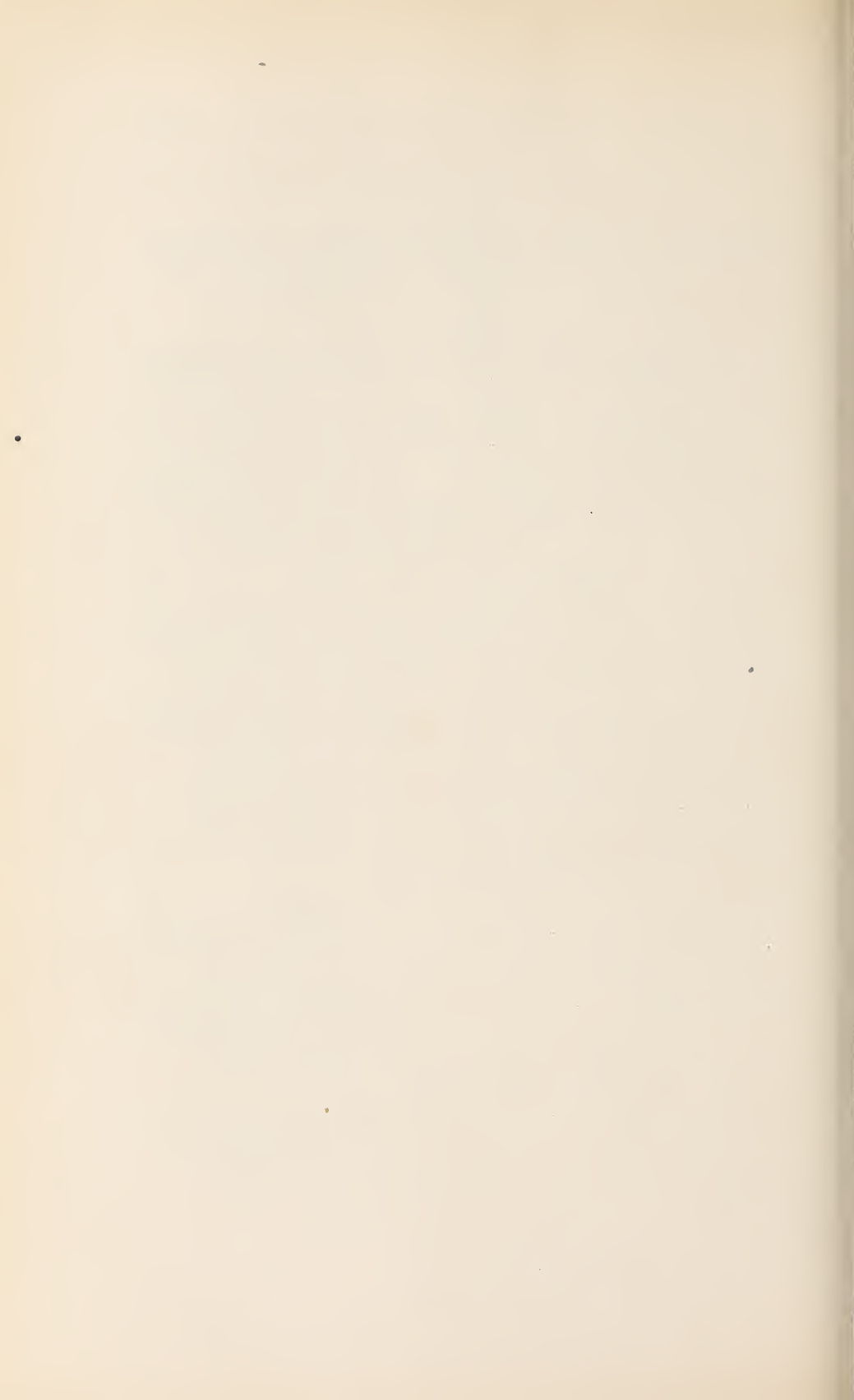
Thalassophryne quadrizonatus Eigenmann, Memoirs Carnegie Museum, IX, 1922, 217.

Type, No. 3921, 35 mm., Rio Truando, Atrato Basin, Colombia; Wilson.

Order **PLECTOGNATHI.**

Family TETRAODONTIDÆ.

Spheroides asterias Blosser, Annals Carnegie Museum, VI, 1909, 300.
Type, No. 1475, 28 mm., St. Croix, Danish West Indies;
Eigenmann.



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ANNALS

OF THE

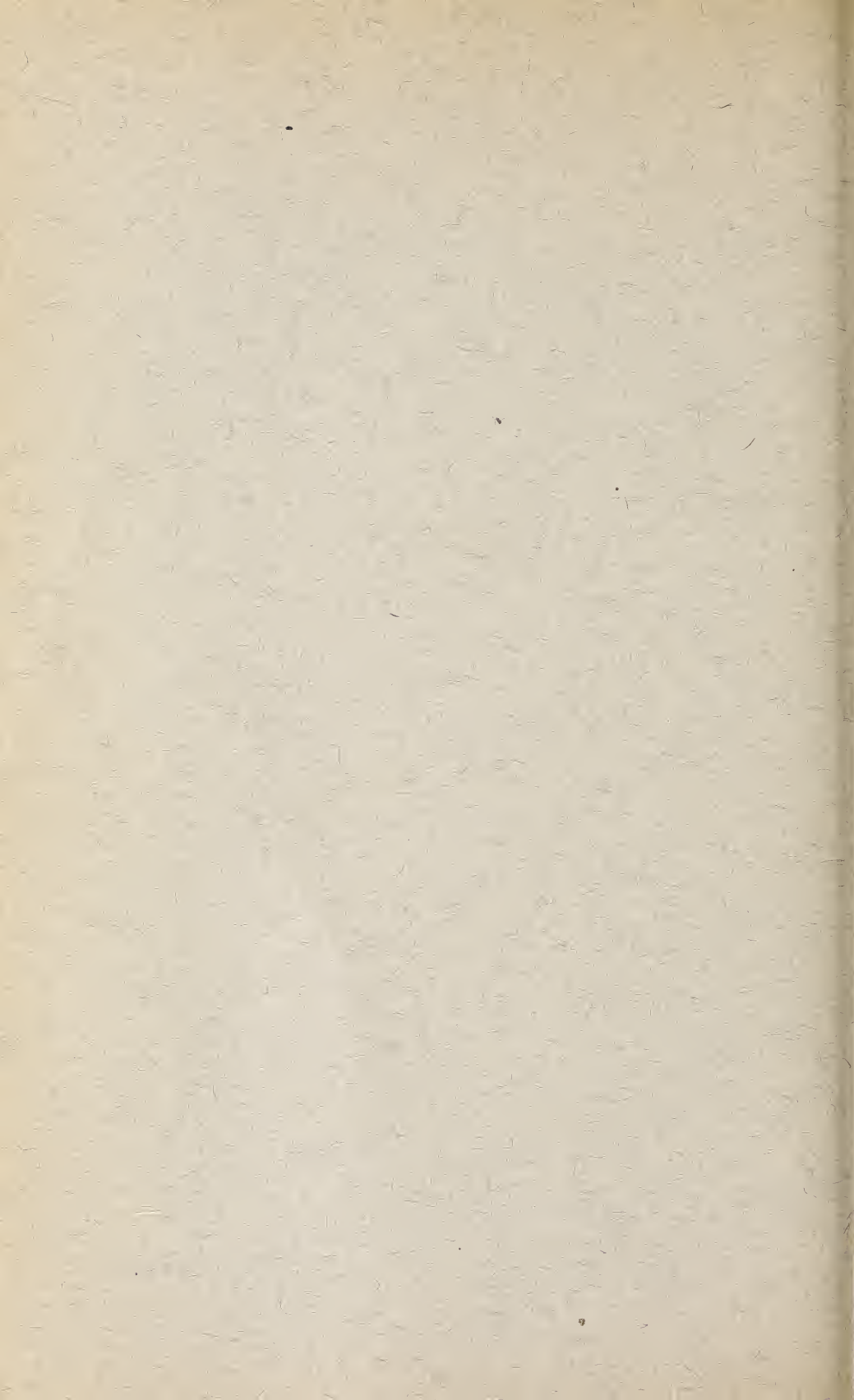


CARNEGIE MUSEUM

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For sale by Messrs. Wheldon & Wesley, Ltd., 2-4, Arthur St., New Oxford St., London, W. C. 2, England; Messrs. R. Friedländer u. Sohn, 11 Carlstrasse, Berlin, N. W. 6, Germany; Maruzen Company, Ltd., 11-16, Nihonbashi, Tori-Sanchome, Tokyo, Japan; and at the Carnegie Museum, Schenley Park, Pittsburgh, Penna., U. S. A.



ANNALS

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CARNEGIE MUSEUM

VOLUME XIX, No. 2.

EDITORIAL NOTES.

The Thirty-second Celebration of Founder's Day was observed by the Carnegie Institute on October 18th, 1928. The guest of honor and principal speaker was Hon. Andrew W. Mellon, Secretary of the Treasury of the United States, who, as a Trustee of the Carnegie Institute for many years has proved himself a most generous friend. An enthusiastic company filled the audience chamber. Mr. Mellon chose as the theme of his address "Developing the Nation's Capital." He gave a lucid account of the designs for the city prepared by L'Enfant, to which more or less fitful adherence has been given. To-day there is a marked tendency to revert to these splendid original designs. Mr. Mellon's interest in the matter is due to the fact that the responsibility for the acquisition of sites and the erection of governmental buildings has been placed by Congress in charge of the Secretary of the Treasury, and he, therefore, during his tenure of office is responsible for the execution of all work intended to improve and adorn the capital city.

The Editor may be pardoned for making at this point reference to certain facts which are within his knowledge. The maiden name of the mother of the present Secretary of the Treasury was Sarah Jane Negley. Her ancestors, shortly after coming to this country in the early part of the Eighteenth Century acquired a large tract of land within the limits of what is now Germantown, Philadelphia. To this day this tract, originally a farm comprising one hundred and fifty acres, is known as "Negley's Hill," a name familiar to all Phila-

delphians. When the question of the location of the capital of the United States was first discussed in Congress, among the many sites which were proposed was "Negley's Hill." Morrisville on the Delaware opposite Trenton was another site advocated in the debates which took place. Finally, as every one knows, the present District of Columbia came into being, largely under the inspiration of the first President of the Republic and his friends. The city of Washington was created on what at that time was vacant farm-lands. It has come to be one of the most beautiful capital cities in the world.

The Garden Club of Allegheny County with signal generosity, has made it possible to install in the Gallery of Plants a group representing the spring flowers of western Pennsylvania. After a luncheon at her beautiful residence tendered to the Club and many invited guests by Mrs. Roy A. Hunt, the President of the Club, the formal unveiling and presentation of the group was made on the afternoon of December 5, 1928. Mrs. Hunt presided with great grace. A highly representative company of ladies and gentlemen was assembled. It was the privilege of the Director Emeritus on behalf of the Museum to accept the gift, after Mrs. Hunt had addressed the company and the group had been unveiled by Mrs. T. H. B. McKnight. Other addresses appropriate to the occasion were made by Mrs. John A. Stewart, of New York, President of the Garden Club of America; Mrs. S. V. R. Crosby, of Boston, Chairman of the Conservation Committee of the Garden Club of America; Mrs. Louis J. Francke, Vice-Chairman of the Conservation Committee of the Garden Club of America; Mrs. Horatio Gates Lloyd of Philadelphia, and Dr. Otto E. Jennings, Curator of Botany in the Museum.

Great credit should be given to Mr. Ottmar Fuehrer, Dr. O. E. Jennings, and their assistants for the exceedingly artistic and natural effects, which have been achieved in this group, which is the first of a series of four, which it is proposed to place in the Gallery of Plants. Material for the composition of the second group, which will illustrate the vegetation of the arid lands of the southwestern states has already been assembled.

The Editor of the Annals congratulates his successor in the Directorship of the Museum, Dr. A. Avinoff, upon having on December 18th become a full-fledged American citizen. A man of distinction in

Russia, his fatherland, he is destined to prove himself no less a man of distinction in his adopted country.

It is with deep regret that record is made of the fact that Mrs. Ernest G. Holt has been temporarily incapacitated by severe illness from continuing her work in Venezuela with her husband. She is at present in New York City slowly recuperating. Mr. Holt after bringing his wife back to this country immediately returned to his duties in Venezuela.

Mr. Graham Netting is taking a postgraduate course at the University of Michigan, where he is specializing in Zoölogy and acting as an assistant in the Natural History Museum. His friends in the Carnegie Museum were delighted to welcome him among them during the mid-winter vacation.

Mr. and Mrs. Rudyerd Boulton have left for a long tour in Africa. They go as companions of Mrs. Oscar S. Straus and will endeavor to make the journey from Cairo up the Nile to Lake Tanganyika and beyond. During the earlier part of their journey they will collect specimens for the American Museum of Natural History. During the latter part of their pilgrimage they will collect birds and insects for the Carnegie Museum. The best wishes of their friends in Pittsburgh attend them in their wanderings.

With regret we make record of the fact that the Carnegie Museum has lost the presence and services of Mr. Arthur S. Coggeshall, who for nearly thirty years has been connected with the Carnegie Museum. He has left us in order to become the Director of the Natural History Institute and Museum in St. Paul, Minnesota. For many years Mr. Coggeshall served the Carnegie Museum as a collector and preparator in the Section of Paleontology. During quite recent years he has been in charge of juvenile instruction in the Museum. He has also had charge of the lecture-courses given by the Museum. The Editor recalls with pleasure the many occasions on which Mr. Coggeshall went with him to foreign lands for the purpose of installing in various national museums in Europe and South America replicas of that famous fossil, *Diplodocus carnegiei*. Mr. Coggeshall was a pleasant travelling companion both on sea and on land. He is an experienced

preparator of fossils. His loss to us is gain to the infant institution in St. Paul, which has called him into its service. Our best wishes attend him.

The series of Thursday lectures for the present year was initiated on the evening of Thanksgiving day, November 29th, when Captain John B. Noel addressed a large and appreciative audience. Captain Noel is well known as one of those who have participated in the recent expeditions organized by the Royal Geographic Society of London for the purpose of reaching the summit of Mt. Everest, the highest mountain in the world. Captain Noel was the official photographer of the various expeditions and was able to ascend to an altitude of twenty three thousand feet. His lecture was magnificently illustrated by several reels of motion pictures and a series of excellently colored photographic slides.

Another of those who recently lectured before the Museum was Dr. Sylvanus G. Morley of the Carnegie Institution in Washington, who supplemented the account which he gave us on a previous occasion, by outlining the more recent archæological discoveries made in Yucatan.

In recent years, as everybody knows, the period between Christmas and the first day of each New Year has been by consent set apart as "Convocation Week." Many of the learned societies in the United States and Canada hold their meetings at this time. A number of the members of the Staff of the Museum attended the sessions of the American Association for the Advancement of Science in New York City and were present at the gatherings of various sections.

Dr. Avinoff, the Director, attended the annual meeting of the Council and the Executive Committee of the American Association of Museums. He also was present at the yearly exhibition given by the Carnegie Institution of Washington showing the results of the efforts, which are being made by that institution to increase human knowledge.

Echoes of the International Entomological Congress at Ithaca are still heard. Letters have been received from many of the forty members of the Congress who came in a body to Pittsburgh. One of them was so complimentary as to say that 'the delightful day we passed in

Pittsburgh marked the climax (Höhepunkt) of our experiences on the occasion of our eventful journey.' The Editor has received various European journals giving accounts of their experiences and impressions in America by visiting delegates.

During September we were honored by visits paid by a number of foreign entomologists who spent some time with us in more or less leisurely studying groups of insects in which they are specially interested. Among them was Mr. W. H. T. Tams of the British Museum, who spent two days in studying our *Lasiocampidæ*; Dr. J. B. Corporaal of Amsterdam, the Secretary of the Entomological Society of the Netherlands, who devoted himself to our *Cleridæ*, and has kindly undertaken to identify the African and South American material in our possession, which has already been sent to him; Dr. F. R. Rambousek of Prague, who passed several days in studying our series of *Staphylinidæ*. Dr. Rambousek most obligingly offered his services in identifying the unnamed species of this family in our possession. He is the leading authority upon the *Staphylinidæ*. From Pittsburgh he went to Cuba, and kindly sent us some interesting butterflies, which he collected for us on that island. It was a delight to welcome Dr. E. P. Van Duzee of the California Academy of Sciences, who is particularly interested in our South American *Pentatomidæ*, which he has agreed to study, and upon which we trust he will submit a report for publication. Mr. G. Talbot of the Hill Museum, England, studied some of our oriental *Pieridæ*, belonging to the genus *Delias*. We also greatly enjoyed the visit of Mr. I. N. Filipiev, a distinguished Russian entomologist, who at present is engaged in carrying on some researches at Yale University. The visit of Captain Carl P. Russell of the National Park Service Department of the Interior, Washington, must not be forgotten. Captain Russell is rendering fine service in his special field.

Through the courtesy of the Worcester Art Museum and the Pennsylvania Museum we have received for temporary display a collection of textiles showing the technique of the art of weaving at different periods in various lands. It has been placed on view in one of the galleries of the Department of Fine Arts, that Department having most obligingly granted the use of the room for this purpose.

As usual we have had the pleasure of welcoming students coming

from various colleges and universities, in most cases attended by the Professors in charge of the departments of study, in which they are carrying on their work. During the past few days we have welcomed a large body of the students of West Virginia University, who spent the day with us under the care of the Professor of Geology, Dr. John L. Tilton. Classes from the Pennsylvania College for Women have been received; classes from Westminster College were welcomed; and we were particularly glad to extend a cordial reception to two students from the University of Bologna, Italy, the oldest university in the world, who spent some time with us.

v

V. SOME CRETACEOUS MAMMALS FROM THE LANCE FORMATION.

BY GEORGE GAYLORD SIMPSON.

The Carnegie Museum possesses an important collection of mammals from the Lance Formation made in 1900 by J. B. Hatcher at the classical localities in Niobrara County, Wyoming, where Marsh obtained all his mammalian specimens of this age. Through the kindness of Mr. O. A. Peterson, this collection was recently submitted to me for study, and some notes upon it are here presented.

Like all collections from this formation, the specimens are chiefly isolated teeth, difficult to study and to interpret. So far as possible, this material will be made the subject of revision in a forthcoming memoir. The present brief paper is confined to the description and illustration of several somewhat complete, and unique specimens. The most important of these is the lower jaw described below as representing a new genus and species. So many names have already been applied to specimens from the Lance formation, and the taxonomy of the whole mammalian fauna of these beds is so confused, that in general I have preferred to follow Osborn, basing the classification of the Didelphyids of the Lance mainly on the upper molars, and using a few names very broadly to include the different types of dentition, even though by adopting this course each name may eventually be found to cover more than one natural genus. The final solution of the problems involved can eventually only be reached by the acquisition of more complete material showing associated teeth and jaws. Although the application of new names to isolated teeth is now seldom justifiable, as more determinable specimens are found, it will be essential to apply names to them: old names, if possible; new names, if necessary. With the end in view of really fixing the characters of the mammals from the Lance beds two advances are made in this paper. A lower jaw with the dentition more complete than any other known from this formation is described, and inasmuch as it cannot be referred to any of Marsh's genera or species, it is given a name. An upper jaw, also unusually complete, is made the neotype of *Pedionomys elegans* Marsh.

Class MAMMALIA.

Order MARSUPIALIA.

Family DIDELPHYIDÆ.

SUBFAMILY PEDIOMYINÆ.

EUANGELISTES, gen. nov.

Type: *E. petersoni*, sp. nov.

Diagnosis: A PEDIOMYINE of medium size. Molar trigonids elevated and sharply cut off from talonids. Trigonids compressed anteroposteriorly. Protoconids and metaconids subequal. M_1 without trigonid basin, paraconid basal, vestigial. M_{2-4} with paraconids very small and progressively more nearly median.

***Euangelistes petersoni*, sp. nov.**

Type: Carnegie Museum Cat. Vert. Foss. No. 11,657. Left lower jaw with P_3 and M_{1-4} .*

Horizon and Locality: Lance formation, Niobrara County, Wyoming.

Diagnosis: Length M_{1-4} , 7.6 mm.; P_3 , 2.0 mm.; depth of ramus internally below M_4 , 4.0 mm.

P_3 is of about the same length as the molars, and, like them, is composed of nearly equal anterior and posterior portions. Anteriorly, however, there is only a single blade-like cusp and the heel is narrow and without basin. The whole tooth is compressed transversely. There is a minute anterior basal cusp, somewhat damaged in this specimen.

The succeeding tooth, although slightly different from those which follow it, is surely a molar. It is fully molariform and its eruption took place before that of P_3 . The structure of the molars is highly characteristic, and does not compare with that of any other Didelphyid. The trigonids are slender and lofty, considerably higher than the talonids, and very sharply separated from the latter. They are unusually short, compressed anteroposteriorly. The metaconid is slightly smaller than the protoconid on M_1 , but on the other molars these cusps are equal save as modified by wear. The paraconid is extremely reduced. On M_1 it is a minute, vestigial basal cuspule. On M_{2-4} it is higher on the crown, and larger (although still very small), and there is a true short trigonid basin. On M_4 the paraconid is antero-external to the metaconid and nearly median; on M_{2-3} it is slightly more internal. The heel has in each case the usual three cusps, the hypoconulid and entoconid closely approximated. The talonid of M_2 is wider than the trigonid, those of the other molars slightly narrower than the respective trigonids. On M_4 the hypoconulid projects more posteriorly than on the other molars, but its relationships are the same. On each molar there is a narrow, sharp, steeply inclined antero-external cingulum.

This jaw furnishes further evidence that the majority of the small insectivore-like teeth from the Lance beds really belong to marsupials of didelphyid type. The simple last premolar and four true molars, each six-cusped, with antero-external cingulum and approximated hypoconulid and entoconid, admit of no other interpretation. Among

* M_4 has been lost since the specimen was studied.

the Didelphyids from the Lance formation the genus belongs with the less robust, more *Didelphys*-like group of the *Pediomyinæ*, as shown by its slender premolar, and sharp, elevated trigonids. Of previously named forms *Euangelistes petersoni* can only be closely compared with *Cimolestes incisus* Marsh, which was based upon a single lower molar, 3.6 mm. in length, with elevated trigonid and reduced paraconid. But

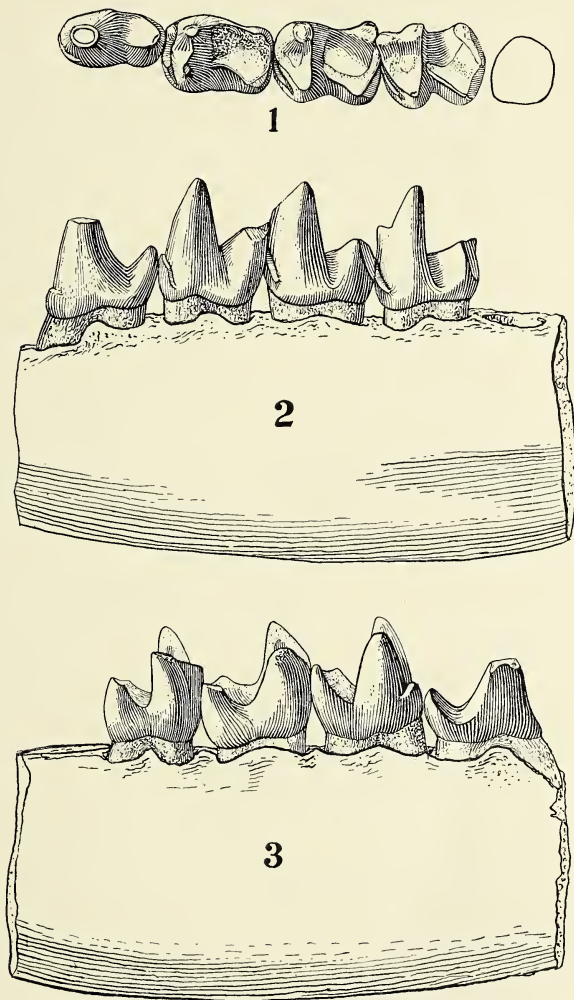


Fig. 1. *Euangelistes petersoni* Simpson. Type. C. M. Cat. Vert. Foss., No. 11,657. Enlarged 5 diam. 1. Crown view; 2. External view; 3. Internal view.

the present molars are little over half as large (each about 2.0 mm. in length) and have relatively shorter trigonids and much smaller paraconids. They differ both specifically and generically from *Cimolestes incisus*. Another tooth figured by Marsh (Amer. Jour. Sci., (3) XLIII, Pl. X, Fig. 5) as a lower molar and referred by him to *Cimolestes incisus*, but which apparently does not belong to that species, may be an M_1 referable to *Euangelistes*, although the disparity in height between trigonid and talonid appears to be less than in *E. petersoni*.

The upper molars of *Euangelistes* are undoubtedly among those, which must still be included in *Pediomys* (*sens. lat.*). In size the specimen is comparable to *Pediomys elegans*; but there are lower teeth, heretofore regarded as generically distinct, which might well fit and conform to the upper teeth of this form.

Pediomyinæ, gen. et sp. indet.

Another specimen, Carnegie Mus. Cat. Vert. Foss., No. 11,656, represents a small *Pediomyine* with an extremely slender horizontal ramus. It is a left lower jaw with M_{1-2} . Smaller than *Euangelistes petersoni*, it is also very different in structure and considerably more like the post-Cretaceous *Didelphyids*. The trigonid is low, with normally developed cusps, the proportions of protoconid, metaconid, and paraconid, which are progressively smaller in the order named, much as in *Peratherium* or *Didelphys*. The trigonid of M_1 is elongate and compressed transversely. This tooth is 1.6 mm. in length, and

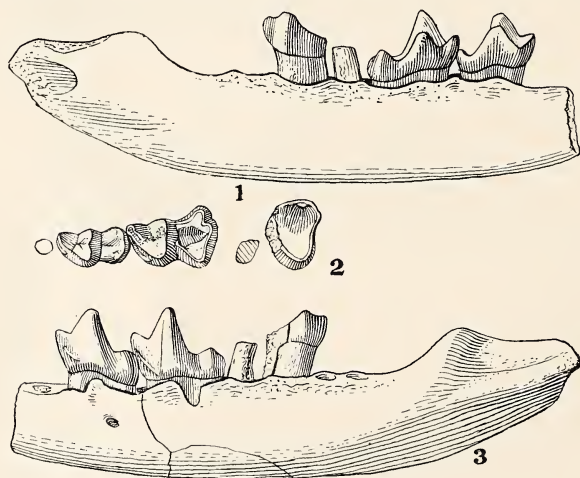


Fig. 2. *Pediomyinæ, gen. et sp. indet.* C. M. Cat. Vert. Foss., No. 11,656. Enlarged 7.5 diameters. 1. Internal view; 2. Crown view; 3. External view.

the depth of the ramus below it internally is only about 1.5 mm. This exact type of Lance lower teeth has never received a name and it is not proposed to base one on this material. Similar, but larger, teeth were referred by Marsh to *Batodon* and *Pedimys*, but without direct evidence of true association with either genus in a restricted sense. Slight variants of this pattern, ranging from this minute size up to molars about 3 mm. in length are common in the Lance and belong to the *Pedimys*-group.

Pedimys elegans Marsh.

Carnegie Museum Cat. Vert. Foss. No. 11,658, is part of a right upper jaw with M^{2-4} . The molars are didelphyid in number, arrangement, form, and structure. The more important differences from *Didelphys*, believed to be primitive and structurally ancestral, are:

1. Molars more transverse, with distinct equal conules.
2. Paracone and metacone of M^{2-3} subequal.
3. External cingulum of M^{2-3} with five styles, the second (opposite the paracone) smallest, the others about equal.
4. Small antero-external cingulum joining first style and anterior conule.

The teeth have the additional, probably not primitive, peculiarity that a slight cingulum passes around the base of the protocone upon the antero-internal and postero-internal faces.

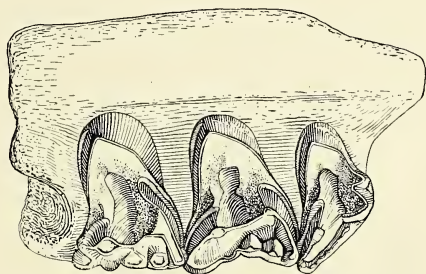


Fig. 3. *Pedimys elegans* Marsh. C. M. Cat. Vert. Foss., No. 11,658. Enlarged 7.5 diam. (Neotype of *P. elegans* Marsh).

Not only does this specimen serve to correct or confirm previous conjectures as to the orientation and affinities of pediomyine upper molars, but it also fixes the exact significance of the name *Pedimys elegans*, the first name applied to any of the smaller Lance tritubercular upper molars. The type of this species is Yale Peabody Museum, No. 11,866, a single upper molar, broken and weathered. This

poorly preserved type is of the same size and, so far as can be determined, of the same structure as M^3 of the present specimen, and the latter may be designated as a neotype.

Order **MULTITUBERCULATA.**

Family **PTILODONTIDÆ.**

***Cimolomys*, sp. indet.**

Occasion is here taken to figure two interesting and unusually good specimens of smaller Lance Ptilodontids, referable to *Cimolomys* in a

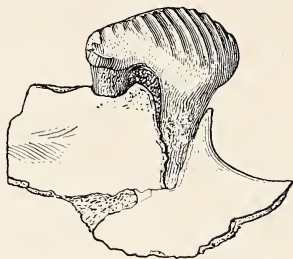


Fig. 4. Right lower premolar of *Cimolomys*, sp. indet. C. M. Cat. Vert. Foss., No. 11,660. Enlarged 4.5 diameters.

broad sense. One, Carnegie Museum Cat. Vert. Foss. No. 11,660, is a right lower jaw with the shearing premolar in place. (Fig. 4.) This is a relatively long and low tooth, typically ptilodontid, originally with thirteen or fourteen serrations on the shearing edge. The second, Carnegie Museum Cat. Vert. Foss., No. 11,661, is part of a right lower jaw with the two molars. M_1 is long and narrow, with a cusp formula

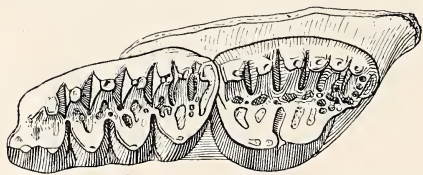


Fig. 5. Right lower molars of *Cimolomys*, sp. indet. C. M. Cat. Vert. Foss., No. 11,661. Enlarged 7.5 diameters.

of 8-5. M_2 is relatively larger than in most members of this family, and has a high number of external cusps, those posterior with confluent bases, as is usual. (Fig. 5.) The formula is 6-2. The shapes of the cusps and the complex ridge pattern, seen in the figures, are characteristic of the family.

Meniscoëssus, sp. indet.

Carnegie Museum Cat. Vert. Foss. No. 11,659, is a right M¹ referable to this larger genus. (Fig. 6.) Being nearly unworn it shows

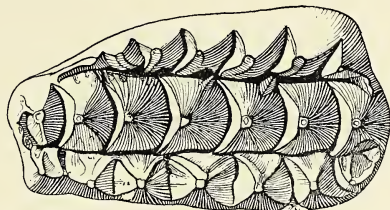


Fig. 6. Right upper molar of *Meniscoëssus* sp. indet. C. M. Cat. Vert. Foss., No. 11,659. Enlarged 5 diameters.

the high strongly selenodont complex of cusps of *Meniscoëssus* to advantage and is figured for this reason.

VI. A COLLECTION OF PALEOCENE MAMMALS FROM BEAR CREEK, MONTANA.

BY GEORGE GAYLORD SIMPSON.

After the discovery of a new locality for Fort Union mammals in 1926 by Dr. J. C. F. Siegfriedt, collections were made in the summer of 1927 by Barnum Brown for the American Museum of Natural History and by J. LeRoy Kay for the Carnegie Museum. Mr. Kay also worked this deposit for some time during the winter of 1927-28. The original collection made for the American Museum has already been described elsewhere¹, and the collection in the Carnegie Museum, in so far as it adds to previous knowledge, is here considered. I am indebted to the authorities of the Carnegie Museum for the privilege of making this study. The illustrations in this paper, except Fig. 4, are from drawings by Mr. Sydney Prentice.

All of these mammals are from a layer of carbonaceous clay above Coal Vein No. 3, in the Eagle Mine, Bear Creek, Carbon County, Montana. A revised list, including all the mammals so far identified in the collections of the American Museum, the Carnegie Museum, and that of Dr. Siegfriedt, follows:

INSECTIVORA.

Family PLAGIOMENIDÆ.

Planetetherium mirabile SIMPSON.

Family NYCTITHERIIDÆ.

Protentomodon ursirivalis SIMPSON.

Family PANTOLESTIDÆ.

Pentacodon cf. inversus COPE.

Family LEPTICTIDÆ.

Leptacodon (Leipsanolestes) siegfriedti (SIMPSON).

INSECTIVORA OR PRIMATES.

Family PLESIADAPIDÆ.

Plesiadapis sp. indet.

Labiodolemur kayi, sp. nov.

¹Simpson, G. G., 1928. A New Mammalian Fauna from the Fort Union of Southern Montana. Amer. Mus. Novitates, No. 297.

Family TARSIIDÆ.

Carpolestes nigrident SIMPSON.

TÆNIODONTA.

Family STYLINODONTIDÆ.

Psittacotherium sp.

CREODONTA.

Family OXYCLÆNIDÆ.

Thryptacodon pseudarctos SIMPSON.

Family MESONYCHIDÆ.

Dissacus cf. navajovius COPE.

DESCRIPTIONS.

Order INSECTIVORA.

Family PLAGIOMENIDÆ Matthew, 1918.

Planetetherium mirabile SIMPSON, 1928.

The new material permits important emendations and additions to our knowledge of this curious animal. The heel of M_3 proves to have been badly preserved in the specimen previously figured², but is complete and nearly unworn in Carn. Mus. Cat. Vert. Foss., No. 11,700. On the heel the hypoconid is low and single. The external

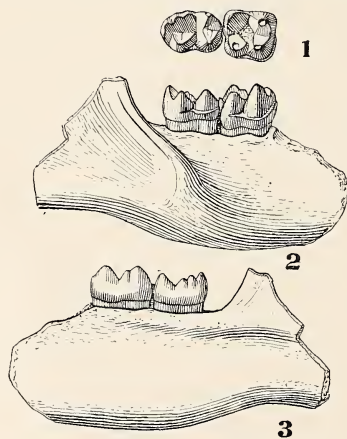


Fig. 1. *Planetetherium mirabile* Simpson. C. M. Cat. Vert. Foss., No. 11,700.
1. Crown view; 2. External view; 3. Internal view. Enlarged 3 diameters.

²Amer. Mus. No. 22,161. Simpson, Am. Mus. Novitates, 297, 1928, p. 13. fig. 8.

and posterior sides of the basin are formed by a single oblique wall, the main part of which is constituted by two subequal cusps, the entoconid and hypoconulid. Anterior and slightly external to the former is a small and imperfectly differentiated cuspule, and internal and slightly posterior to the hypoconulid is a still smaller cuspule.

Most valuable of the new material referable to this species is a right upper jaw with P^3 - M^1 , Carnegie Museum Cat. Vert. Foss., No. 11,671. This confirms the generic reference of the two teeth previously described³ but shows that the analogies used in identifying their positions in the series were false. The supposed M^2 is probably P^4 and the supposed P^4 is probably P^3 . Little doubt attaches to the specific reference of the present specimen. It occludes perfectly with the lower teeth of this species and its dental characters are harmonious.

P^3 is submolariform, but is longer and narrower than the molars; the styles small and nearly in line with the paracone and metacone, the latter imperfectly separated and the metacone the smaller of the two; conules absent, protocone reduced and talon-like. There was a short diastema in front of this tooth. P^4 has previously been described (as M^2). It is fully molariform and has a blunt protocone, directed somewhat forward, two small equal conules, large equal paracone and metacone, distinct metastyle directly external to the metacone, small parastyle anterior to the paracone, and an irregular external cingulum. M^1 is somewhat similar, but is less oblique and has a longitudinal series of four small cusps between the paracone and metacone and the external cingulum. On both P^4 and M^1 there are narrow, regular anterior and posterior cingula, as well as the irregular external cingulum, but they do not extend forward upon the base of the protocone and there is no trace of a hypocone.

The mental foramen is above the anterior root of P^3 . The zygoma arises chiefly above M^1 and its root is flattened and excavated laterally.

This new material permits an important step forward in the interpretation of the relationships of this extraordinary genus. The structure of the parts now known is so distinctive from other groups, but so similar to that of *Plagiomene* Matthew from the Wasatch⁴ that intimate relationship with the latter can hardly be questioned. Among the numerous points of resemblance may be noted the following: fully molariform P^4 ; molar paraconids reduced, median; protoconid and metaconid subequal; talonid structure almost identical; external cingulum on lower molars; rugose enamel; upper molar structure almost identical; mental foramen and anterior root of zygoma similar in position and structure.

Planeletherium is thus to be placed in the family *Plagiomenidae*

³Amer. Mus. Nos. 22,160, 22,168. Simpson, *loc. cit.*, 1928, pp. 12-13, fig.9.

⁴Matthew, W. D., 1918. Bull. Am. Mus. Nat. Hist., XXXVIII, p. 598-602.

among the Insectivora. There is nothing definite to add regarding the dubious relationships of this family. Matthew has suggested tentatively that it may be related to the *Galeopithecidae* and the evidence on this point is not materially altered by the addition of this more ancient genus to the family.

Family LEPTICTIDÆ, GILL, 1872.

Genus LEPTACODON, Matthew & Granger, 1921.

Diagnosis: Trigonids lower than in *Diacodon*, paraconids distinct, but small; protoconids nearly equal to metaconids, or slightly higher. Molars reduced in size from first to third. Heel of M_3 with three subequal cusps, hypoconulid strongly projecting posteriorly, but not excluded from basin. P_4 with small metaconid almost connate with the protoconid, heel with small narrow internal basin and long external slope.

Type: *L. tener* Matthew & Granger, 1921.

Restudy of *Leipsanolestes* Simpson persuades me that I was in error in distinguishing this genus too sharply from *Leptacodon* and in not referring it to the *Leptictidae*. It now seems best to consider it as a subgenus only. Aside from further study of the original material, this conclusion is based on new and better specimens in the collection of the Carnegie Museum and also on publication of further data regarding *Adapisorex*, an allied European genus, by Teilhard.⁵ The resemblance of *Leipsanolestes* to *Adapisorex* remains, of course, but it is less close than to *Leptacodon*, and Teilhard has now shown that the genus *Adapisorex* is leptictid in structure and that the family *Adapisoricidae* has little claim to conservation. As Teilhard points out, this altered conception tends to invalidate the view of Lemoine, Matthew, and others, that the Adapisoricids were ancestral to the Tupaiids, although it does not preclude a close collateral relationship.

Subgenus LEIPSANOLESTES Simpson.

Diagnosis: Internal cusps of lower molars more elevated relative to external cusps than in typical *Leptacodon*. Hypoconulid of M_{1-2} not projecting quite so far posteriorly. Cusps slightly stouter.

Type: *Leptacodon* (*Leipsanolestes*) *siegfriedti* (Simpson).

Leptacodon (**Leipsanolestes**) **siegfriedti** (Simpson), 1928.

This species was sufficiently characterized in the original publication. Although a small form, it is generally more robust than *Leptacodon tener*. One of the new specimens, a right lower jaw with P_4 - M_3

⁵P. Teilhard de Chardin, 1927. Mém. d. Musée Roy. d'Hist. Nat. Belgique, No. 36, p. 7-11. A copy of this important work did not reach me until after the publication of my first paper on the Bear Creek fauna.

(Carnegie Mus. Cat. Vert. Foss., No. 11,553), differs from a previously figured specimen⁶ in having P_4 slightly more robust, the heel basin wider, but this is insufficient for specific distinction.

INSECTIVORA OR PRIMATES.

Family PLESIADAPIDÆ Trouessart, 1897.

Genus LABIDOLEMUR Matthew & Granger, 1921.

Diagnosis: Dental formula probably $I_1 C_0 P_1 M_3$. One greatly enlarged procumbent incisor, crown completely enameled, trihedral, with knife-like supero-external margin, tip curved upwards, large root extending back beneath cheek-teeth. P_4 reduced, with simple recurved apex and unbasined heel. Molar trigonids elongate, subquadrate. Protoconid and metaconid subequal, the latter somewhat the more posterior. Paraconid antero-internal, small but distinct, well removed from the larger metaconid. A minute, ridge-like fourth trigonid cusp anterior to the protoconid, progressively less distinct from M_1 to M_3 . Talonids on M_{1-2} wide, basined, cusps of elevated rim indistinctly differentiated. Trigonid of M_3 about same size as that of M_2 , talonid very slightly longer, with a simple oval basin surrounded by a continuous, obscurely cuspidate rim. Jaw relatively short and deep, with posterior mental foramen beneath molars.

Type: *Labidolemur soricoides* Matthew & Granger.

The above diagnosis extends and somewhat alters that given by Matthew and Granger in the original description of the genus,⁷ the changes being due to the present Fort Union specimen and to a re-study of the original genotypic materials on this basis. The peculiarity of the trigonid is recognized in more detail. M_3 , especially, is believed to be quite different from that originally referred to the genus. The authors of the genus drew their conception of M_3 from two supposed topotypes of *L. soricoides* (from the Mason Pocket of the Tiffany Beds in southwestern Colorado), one including M_{2-3} and the other an isolated M_3 . I believe the reference of these specimens to this species probably to have been incorrect. In the referred M_2 the trigonid is very short, with subequal and almost connate paraconid and metaconid, and the heels of the referred last molars are bilobed and very elongate. This sort of M_3 could not belong in the alveoli of the type of *L. soricoides*, it is too large, too elongate, the posterior root too large in proportion to the anterior. The Bear Creek specimen described below is very close to *L. soricoides* in the structure of M_1 . Its type of last lower molar could well be accommodated by the alveoli of the genoholotype, allowing for difference of species, and is much more harmonious with M_1 in structure than are the posterior molars referred to the genus by Matthew and Granger.

⁶Amer. Mus. No. 22,179. Simpson, *loc. cit.*, 1928, fig. 3a.

⁷Matthew, W. D., and Granger, W. 1921. Amer. Mus. Novitates, No. 13, p. 4.

An incisor from the Bear Creek deposit has previously been referred to *Labidolemur*⁸. Its root is of the same size and proportions as that preserved in the present specimen and it probably belonged to the same species.

The systematic position of this genus is very uncertain. The molar type is unique, but finds its closest analogies among some of the early Tarsioids. The resemblance is not conclusive, but this general molar type combined with reduced ante-molars and an enlarged procumbent incisor permits inclusion in the *Plesiadapida*. This reference, it must be emphasized, is based as much on the default of evidence as on its presence. The genus is so distinct from the more normal *Plesiadapids* (as *Plesiadapis*, or *Nothodectes*, itself) that real relationship is not assured.

***Labidolemur kayi*, sp. nov.**

Type: C. M. Cat. Vert. Foss., No. 11,703. Part of left lower jaw with P₄-M₃. Collected by J. LeRoy Kay, 1928.

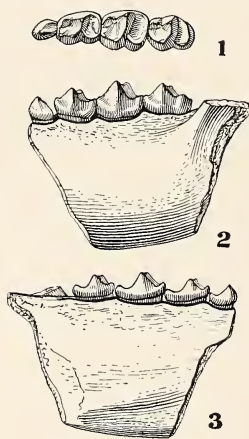


Fig. 2. Left lower jaw of *Labidolemur kayi*, sp. nov. Simpson. Type C. M. Cat. Vert. Foss., No. 11,703. 1. Crown view; 2. External view; 3. Internal view. Enlarged 3 diameters.

Horizon and Locality: Paleocene, Fort Union Series, Eagle Coal Mine, Bear Creek, Carbon County, Montana.

Diagnosis: Paraconid and anteroexternal cusp of M₁ somewhat more distinct, less crest-like, than in *L. soricoides*. Molars slightly larger, length M₁₋₃: 5.7 mm. Jaw relatively deeper, 5.1 mm. in depth below M₂ internally.

⁸Simpson, G. G., *loc. cit.* 1928, p. 15.

TÆNIODONTA.

Family STYLINODONTIDÆ Marsh, 1875.

Psittacotherium, sp. indet.

C. M. Cat. Vert. Foss., No. 11,560, presented by J. F. Lobdell, superintendent of the Eagle Mine, is a right lower canine of a Tæniodont allied to *Psittacotherium*. It does not belong to any described species, and on the evidence of this tooth alone might be a rather advanced species of *Psittacotherium*, a primitive species of *Calamodon*, or a distinct form. From *Psittacotherium multifragum* of the Torrejon

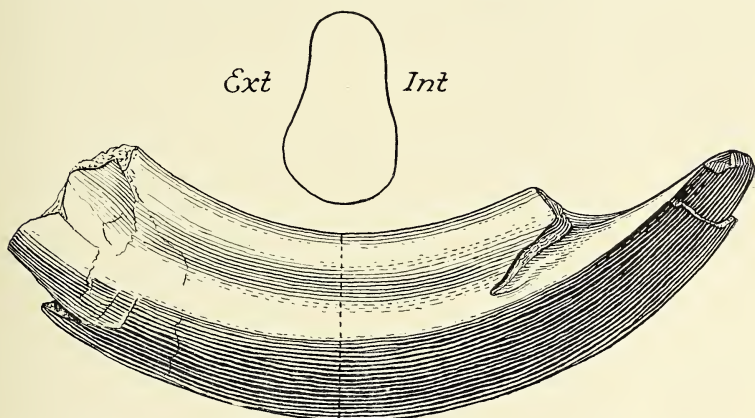


Fig. 3. Right lower canine of *Psittacotherium* sp. indet. C. M. Cat. Vert. Foss., No. 11,560. Slightly reduced.

it differs chiefly in the more compressed posterior, enamel-free portion, and the apparently more persistent, possibly continuous, growth. From *Calamodon simplex* of the Wasatch it differs chiefly in the relatively smaller anteroposterior diameter, shorter length along axis of growth, enamel band not extending quite so far upon the lateral faces, and the absence of longitudinal grooves on the enamel.

Nearly the whole of the tooth is preserved. It is well worn, but growth and enamel deposition were still in progress. The enamel is slightly rugose, but without definite grooves or ridges. The anteroposterior diameter is 27 mm., maximum transverse diameter 16 mm., length along anterior curve 128 mm. (a few millimeters broken off posteriorly).

CREODONTA.

Family MESONYCHIDÆ Cope, 1875.

Dissacus cf. *navajovius* (Cope), 1881.

The presence of *Dissacus* at Bear Creek is established by two teeth in the collection of J. C. F. Siegfriedt, examined through the

kindness of the owner. A second upper molar (Carnegie Museum, Cat. Vert. Foss. No. 11,693, a cast presented by Dr. Siegfriedt) is slightly broader than the corresponding tooth of *D. navajovius* but is not sufficiently well preserved for close comparison. The second specimen, a left M_2 , is slightly larger than in *D. navajovius*, the metaconid lower and more anterior, the paraconid relatively a little larger, the heel lower (possibly from wear). The internal basal swelling is also straighter and less depressed below the posterior notch. The metaconid is lower, the paraconid relatively larger, and the talonid relatively smaller than in *D. navajovius longævus* from the Wasatch. Save for its larger size, the closest resemblance is with *D. europæus* and *D. gaudryi* (possible synonyms) from the French Thanetian. The material does not warrant any exact reference.



Fig. 4. Internal views of second left lower molars of various species of *Dissacus*. A. *Dissacus navajovius*; B. *D. sp.?* from Ft. Union; C. *D. europæus*; D. *D. gaudryi*; E. *D. filholi*; F. *D. prænuntius*; G. *D. navajovius longævus*. (C-E after Teilhard de Chardin).

VII. NOTES UPON SOME GYRINIDÆ IN THE CARNEGIE MUSEUM WITH DESCRIPTIONS OF NEW SPECIES.

BY DR. GEORG OCHS, FRANKFURT-AM-MAIN.

This paper is the result of the examination of some of the *Gyrinidæ* in the Carnegie Museum. The writer wishes to thank Dr. A. Avinoff, the Director, and Dr. Hugo Kahl, Curator of Entomology, who very kindly gave him the opportunity to study this very interesting material.

Genus *GYRINUS* Linnæus.

1. *Gyrinus floridensis* sp. nov.

Long. 4.75—5.25 mm. *Ovalis, vix elongatus, sat convexus. Supra nigro-æneus vel æneus; infra nigro-metallicus, segmento anali rufo, pedibus flavescentibus. Reticulatione in elytris transversa et obliqua; serierum punctis tenuibus, extus vix magis impressis; margine externo parum lato; truncatura convexa, angulis rotundatis.*

Habitat: Lutz, Florida, April, 1926 (Krautwurm, coll.)

Type, male, five male paratypes, and a female (allotype) in the Carnegie Museum; a female (paratype) in collection of Georg Ochs.

Form oval, moderately convex. Upper surface uniformly black, or slightly bronzed, a little more strongly bronzed narrowly along the margins; body beneath bronze-black; anal segment rufous; feet yellowish. Luster rather dull, due to the fine transverse and oblique alutaceous sculpture of the elytra in both sexes. Strial punctures rather fine, not perceptibly larger and more impressed laterally; eleventh stria quite close to the margin, the latter not very wide. *Male genitalia:* Rufo-testaceous, more or less dusky apically; middle lobe broad, arcuately expanded, and above concave apically, where its width is subequal to that of the lateral lobes; tip broadly rounded.

Resembling in size and general appearance *G. analis* Say, but distinguished by the transverse oblique alutaceous ground-sculpture, which is alike in both sexes (in the male of *G. analis* sculpture is nearly wanting, in the female it consists of round meshes). The male genitalia are quite unlike in the two species. In the matter of the genitalia and the ground-sculpture of the elytra there is much affinity to *G. frosti* Fall; the latter, however, is much larger in size, broader in form, and more gibbose, with the lateral margin of the elytra broader.

Genus ENHYDRUS Castelnau.

(*Enhydrus* Castelnau, Étud. Ent., 1834, p. 110)2. *Enhydrus tibialis* Régimbart.*Enhydrus tibialis* RÉGIMBART, 1876, Bull. Soc. Ent. Fr., p. ccxv.*Enhydrus (Epinectes) tibialis* RÉGIMBART, 1877, Ann. Soc. Ent. Fr., (5) VII, p. 107, t. 6, ff. 2, 2a.*Enhydrus tibialis* RÉGIMBART, 1882, Ann. Soc. Ent. Fr., (6) II, p. 431, t. 12, f. 52.*Enhydrus tibialis* RÉGIMBART, 1883, Ann. Soc. Ent. Fr., (6) III, t. 6, f. 69.*Enhydrus tibialis* RÉGIMBART, 1907, Ann. Soc. Ent. Fr., LXXVI, p. 154.

Recorded by Régimbart from Brazil; Matto Grosso (Spencer Moore) British Museum, and Chapa, 2,000 ft. (A. Robert) British Museum. In my collection from Cuyabá, Matto Grosso, (Zimmermann leg.). In the Carnegie Museum a series from Chapada, Matto Grosso, Aug., Dec. (H. H. Smith, coll.).

Genus DINEUTUS Macleay.

(Synonym *Dineutes* auct. mult.)3. *Dineutus (Cyclinus) emarginatus* Say.*Gyrinus emarginatus* SAY, 1825, Trans. Amer. Phil. Soc., II, p. 108.*Dineutes americanus* AUBÉ, 1838, Spec. Col., VI, p. 777.*Dineutes emarginatus* LECONTE, 1868, Proc. Ac. Nat. Sc. Philad., pp. 366-367.*Dineutes emarginatus* RÉGIMBART, 1882, Ann. Soc. Ent. Fr., (6) II, p. 417.*Dineutes emarginatus* ROBERTS, 1895, Trans. Amer. Ent. Soc., XXII, p. 283, Pls. 5 and 6, ff. 3, 3a, 3b.*Dineutes emarginatus* RÉGIMBART, 1907, Ann. Soc. Ent. Fr., LXXVI, p. 148.*Dineutes emarginatus* BLATCHLEY, 1910, Coleopt. of Indiana, p. 241.*Dineutes emarginatus* LONG & MUTCHLER, 1918, Bull. Amer. Mus. N. H., XXXVIII pp. 95-96.*Dineutes emarginatus* BLATCHLEY, 1919, Bull. Amer. Mus. N. H., XLI, p. 316.*Dineutus (Cyclinus) emarginatus* OCHS, 1926, Ent. Zeitschr. Frankf., XXXX, p. 136.

Cited by Leconte (1868, *l. c.*) from the middle and northern States of U. S. A. Roberts (1895, *l. c.*) says more precisely "middle and northern Atlantic States" and adds Virginia as the most southern habitat. Blatchley says it occurs in southern Indiana. I have seen specimens from Mass., Conn., N. Y., N. J., and W. Va., which vary to a certain degree, but generally agree well with the characters given

by Roberts. The largest specimen seen (from W. Va., Cheat River, Aug., in the Carnegie Museum) measures 12 mm. in length.

4. Subsp. **floridensis** subsp. nov.

Size smaller than that of typical specimens (8.5—10 mm.); shape more narrowly oval; surface black, not bronze-red; punctures and striæ very faint. Lateral margins of elytra even less sinuate in the female; sutural angles feebly rounded. Setigerous punctures on the surface of femora apparently only six in the males, seven in the females.

Types from Lutz, Florida, April, 1926 (Krautwurm *coll.*) in the Carnegie Museum and in my collection; additional specimens from the same locality taken March 4-15, 1922 (Krautwurm).

These specimens are very similar to *D. (Cyclinus) carolinus* Lec., consorting with which they were captured, and with which, indeed, I had at first confounded them. But the male genitalia are very different, and the apices of the elytra are not serrulate, as they always are in *D. carolinus*. The latter character, already pointed out by Roberts, is the best for distinguishing *D. emarginatus* and *D. carolinus*. Contrary to what I stated in 1926 (*Cf. Ent. Zeitschr. Frankf.*, XXXX, 1926, p. 191). I am now convinced, that we are dealing with two different species, which in Florida, as well as in Georgia, frequent the same locality, where they live together, becoming more or less affiliated in their characters.

Specimens from Georgia (Bainbridge *coll.* May 30), (J. C. Bradley *coll.* June 1, 1911), and Okefenoke Swamp, Mixons Hammock, June 16, 1912, in the Collection of Cornell University, are intermediate between *emarginatus emarginatus* and *emarginatus floridensis*, but are nearer to the typical form.

5. **Dineutus (Cyclinus) carolinus** Leconte, subsp. **mutchleri** Ochs.

Dineutus carolinus LECONTE, subsp. *mutchleri* OCHS, 1924, *Am. Mus. Novit.*, No. 125, p. 3.

Dineutus (Cyclinus) emarginatus SAY, subsp. *mutchleri* OCHS, 1926, *Ent. Zeitschr. Frankf.*, XXXX, pp. 136, 191.

This form is represented in the collection of the Carnegie Museum by a small series from the Bahamas, (Nassau, Blue Hills; W. W. Worthington *coll.*).

When I described this subspecies, comparison was chiefly made with specimens from Texas. Meanwhile I have seen many specimens of *D. carolinus* from Florida and Georgia, which are less distinct from the Bahaman specimens, than those from Texas; but I do not know whether the latter agree better with specimens from South Carolina, which is the type locality, than with those from Florida and Georgia.

In all male specimens from the above mentioned localities the œdeagus is slender and gradually narrowed to apex, as indicated by me in the description of *D. mutchleri*, and it seems that the figure given by Roberts (Trans. Am. Ent. Soc., XXII, 1895, pl. 6, f.4b) is not correct.

6. *Dineutus (Cyclinus) productus* Roberts.

Dineutes productus ROBERTS, 1895, Trans. Amer. Ent. Soc., XXII, p. 285, Pl. 5 and Pl. 6, ff. 8, 8a, 8b.

Dineutes productus RÉGIMBART, 1907, Ann. Soc. Ent. Fr., LXXVI, p. 146.

Dineutus (Cyclinus) productus OCHS, 1926, Ent. Zeitschr. Frankf., XXXX, p. 137.

Originally described from four specimens from Texas. Régimbart cites another specimen from Carolina. I have seen only one specimen of this species from Dallas, Texas, in the Museum of Berlin, and a small series from Clifton, Texas, May 30, 1907, in the Carnegie Museum.

All other specimens, received from different sources as *productus*, were incorrectly determined, and belonged to other allied species. It seems that *D. productus* is a very scarce insect.

7. *Dineutus (Dineutus s. str.) longimanus* Olivier.

Gyrinus longimanus OLIVIER, 1795, Ent. III, 41, p. 11, t. 1, f. 3.

Gyrinus excisus FORSBERG, 1821, Nov. Act. Ups., VIII, p. 301.

Dineutes longimanus AUBÉ, 1838, Icon. V, p. 408, t. 46, f. 5.

Dineutes longimanus AUBÉ, 1838, Spec. Col., VI, p. 782.

Dineutes longimanus CHEVROLAT, 1863, Ann. S. E. Fr. (4) III, p. 203.

Dineutes longimanus RÉGIMBART, 1882, Ann. S. E. Fr., (6) II, p. 413, t. 11, f. 35.

Dineutes longimanus SHARP, 1882, Biol. Centr.-Amer., I, 2, p. 49.

Dineutes longimanus ZIMMERMANN, 1917, Ent. Mitt., VI, p. 137.

Dineutus longimanus OCHS, 1924, Amer. Mus. Novit., No. 125, p. 5.

Dineutus longimanus OCHS, 1924, Ent. Blätter, XX, p. 236.

Dineutus longimanus OCHS, 1925, Ent. Blätter, XXI, p. 174.

Dineutus (Dineutus s. str.) longimanus OCHS, 1926, Ent. Zeitschr. Frankf., XXXX, pp. 138, 192.

In the collection of the Carnegie Museum from Constanza, San Domingo; 5,000 ft., Aug., 1922. These probably belong to the typical form, as the species was originally described from the island of San Domingo by Olivier. Specimens collected in Porto Rico (subsp. *portoricensis* Ochs, 1924, Amer. Mus. Novit., No. 125, p. 5) are, although somewhat different, apparently the nearest to the typical form. The Carnegie Museum has moreover several specimens from Jamaica (Hope River, Gordon Town, St. Andrews, August, 1900) which seem to approach the subsp. *cubensis* Ochs, 1926, Ent. Zeitschr. Frankf., XXXX, p. 192.

Meantime I have seen in the collection of the United States National Museum specimens from Haiti: Suzanne, Sept. 28, 1925; Camp Perrin, July 30, 1925 (Hoffmann); St. Michel, Nov., 1925 (E. C. Leonard); Porto Rico, Cayey; Castleton Gardens, Jamaica, ca. 500 ft., Jan. 4, 1913 (W. Harris); Cuba; El Guama, Feb. 24-Mar. 5. (Palmer & Riley).

8. *Gyretes levis* Brullé.

Gyretes levis BRULLÉ, 1837-1843, Voyage d'Orbigny, VI, 2, p. 52.

Gyretes levis AUBÉ, 1838, Spec. Col., VI, p. 757.

Gyretes levis RÉGIMBART, 1883, Ann. S. E. Fr., (6) III, p. 398, t. II, f. 115.

Gyretes levis RÉGIMBART, 1891, Ann. S. E. Fr., LX, p. 687.

Gyretes levis RÉGIMBART, 1903, Bull. S. E. Ital., XXXV, p. 73.

Gyretes levis RÉGIMBART, 1907, Ann. S. E. Fr., LXXVI, p. 187.

Gyretes levis ZIMMERMANN, 1924, Boll. Mus. Torino, XXXIX, p. 3.

Gyretes levis ZIMMERMANN, 1924, Ark. f. Zoöl., XVI, 4, p. 3.

In the collection of the Carnegie Museum there is a single female specimen from Brazil (Arima, Rio Purús, Nov., 1922, S. M. Klages coll.), in which the tomentose border of the elytra is very much broadened posteriorly. It resembles specimens seen from the Rio Autaz (Zimmermann *l. c.*, 1924) and probably belongs to the varietal form, which is mentioned by Régimbart from Venezuela (*l. c.*, 1907).

Another female in the Carnegie Museum from Brazil (Matto Grosso, Corumbá, February) and a male specimen from the same locality (Dec. 14-23, 1919, R. G. Harris coll.) contained in the collection of Cornell University are similar to specimens from S. Catarina in my collection, which agree very well with Régimbart's description and perhaps represent the typical form.

9. *Gyretes sexualis* Régimbart.

Gyretes sexualis RÉGIMBART, 1883, Ann. Soc. Ent. Fr., (6) III, p. 388, t. 11, f. 99.

Gyretes sexualis RÉGIMBART, 1891, Ann. Soc. Ent. Fr., LX, p. 684.

Gyretes sexualis RÉGIMBART, 1907, Ann. Soc. Ent. Fr., LXXVI, p. 182.

Gyretes sexualis ZIMMERMANN, 1924, Boll. Mus. Torino, XXXIX, p. 3.

Represented in the collection of the Carnegie Museum by a large female specimen (8 mm. in length) from the Lower Mamoré River, Bolivia (Steinbach coll.). I hitherto had only seen specimens from Paraguay in the Hamburg Museum, which, as already mentioned by Régimbart, are of a little smaller size. Recently I had before me from the Dresden Museum a large male, labelled "Peru(?)" and a female of medium size from Amazonas. In the latter the outline of the posterior constriction of the hairless part of the elytra is more rounded than in the specimens from Paraguay.

10. *Gyretes lucidus* sp. nov.

Long.: 7.5—8. mm. Elongato-ovalis, antice et postice attenuatus, valde convexus. Supra æneus, nitidus, ad latera punctato-tomentosus; infra nigro-piceus, ano et pedibus natatoriis rufis. Labro semi-circulari, supra leviter reticulato, fortiter punctato et ciliis flavis instructo; capite et pronoto fortiter reticulatis (areolis rotundatis) et remote punctatis, spatio lævi in pronoto trapeziformi, margine tomentoso sat lato; elytris spatio lævi vix visibiliter transversim reticulato punctisque remotis instructo, in ♂ elliptico, postice leviter acuminato, in ♀ paulo magis prolongato; margine tomentoso ad basin intus dilatato, postea suturam attingente; truncatura recta, angulo externo spinoso, fortiter producto, interno vix prominulo. Tibiis anticis triangularibus, ad basin valde attenuatis, apicem versus intus dilatatis, angulo externo apicali obtuso rotundato; tarsis in ♂ modice dilatatis, ovalibus, antice attenuatis, in ♀ parallelis angustis.

Habitat: Brasilia, Santarem, Sept.

Type, ♀, in the Carnegie Museum, paratypes in the Carnegie Museum and in my collection.

Nearly related to *G. bidens* Olivier, *G. sexualis* Régimbart, and *G. speculiger* Régimbart. Smaller than *G. bidens* (from Cayenne) and in shape more elongate and less broadened; the tomentose border of elytra broader, the smooth area therefore more narrowly oval, basally more constricted, and posteriorly more strongly acuminate. Larger than *G. speculiger* (paratypes); broader and less attenuated posteriorly. The smooth area in elytra posteriorly much more elongate, and very dissimilar in the females.

A little smaller than *G. sexualis* (from Paraguay), in which the smooth area in elytra is also less elongate and more conspicuously acuminate posteriorly, especially in the females, which are moreover opaque because of the strong alutaceous sculpture on the smooth area of the elytra, while in *G. lucidus* the latter are very shining. The œdeagus of *G. lucidus*, ♂, is nearly as long as the lateral lobes and in its basal parallel part nearly as wide as the lateral lobes at the apex; it is gradually narrowed and acuminate to the apex. In *G. sexualis* and *G. speculiger* the œdeagus is less slender; in *G. speculiger* the lateral lobes are very slender apically, in *G. bidens* the œdeagus is still more broadened.

11. *Gyretes suturalis* Régimbart.

Gyretes suturalis RÉGIMBART, 1883, Ann. S. E. Fr., (6) III, p. 386, t. II, ff. 97, 97a.

Gyretes suturalis RÉGIMBART, 1891, Ann. S. E. Fr., LX, p. 684.

Gyretes suturalis RÉGIMBART, 1907, Ann. S. E. Fr., LXXVI, p. 182.

Hitherto only two male specimens of this species have been known: the type from Yurimaguas (Régimbart *coll.*), another from Nanta (British Museum); both localities on the upper Amazon. The Carnegie Museum has a third specimen, male, from S. Paulo de Olivença, Upper Amazonas, (Klages *coll.*, May, 1923). It measures 9.75 mm. in length. The smooth parts of the upper surface are rather coppery; the under surface is somewhat more brightly coloured than Régimbart's description indicates, being piceous, somewhat rufescent; posterior legs and abdominal segments, the latter especially along the middle, dark red. This makes it probable, that it represents a freshly developed individual. The labrum is strongly punctured and ciliate above, with long reddish hairs along the anterior margin, and only slightly alutaceous towards the base. Clypeus slightly alutaceous. Head and pronotum with a stronger ground-sculpture consisting of round meshes, somewhat vermiculate, and with small distant punctures. Smooth part of elytra not alutaceous, only punctured; on the pubescent areas there is a fine ground-sculpture of round meshes, and the hairs each rise from a deep round groove. Anterior tibiæ with a right exterior apical angle, which is slightly produced by a small sinuation of the exterior margin behind it; anterior tarsi elongate-oval, attenuated at the tip.

Since writing the foregoing I have seen two additional specimens of this species belonging to the Dresden Museum, one of which is a fe-

male. The latter differs from the male in being more elongate; the smooth part of the elytra is more extended posteriorly and the punctures in it are more numerous; as usual the anterior tarsi are not dilated in the female sex. These specimens were taken in Eastern Ecuador by Dr. Ohaus on December 30, 1905, while travelling by boat down the Rio Villano, which rises N. E. of Canalos and joins the Rio Curaray, a right affluent of the Rio Napo. The male measures 10.75 mm. in length; the female only 10.25 mm.; in the smooth part of the elytra there is, under high power, a trace of an alutaceous sculpture, which is rather remarkable in the female.

12. *Gyretes multisetosus* sp. nov.

Long. 4.5—5. mm. Ovalis, vix elongatus, sat convexus, ad humeros parum inflatus, antice et postice attenuatus. Supra niger, nitidus, iridescens; flavo-marginatus. Infra piceus, pectore medio, ano, pedibusque ferrugineis, epipleuris flavis. Labro nigro, transverso, antice parum arcuato et flavo-ciliato, supra punctato-piloso. Reticulatione superficiei fere nulla, margine tomentoso in pronoto antice fere duplo latiore, in elytris sat lato, postice dilatato et suturam ante apicem attingente, elytra cæterum punctis nullis remotis setigeris instructa. Truncatura elytrorum obliqua, leviter bisinuata, angulis interno rotundato, externo obtuso leviter prominulo. Tibiis anticis triangularibus, in ♂ angulo apicali externo valde rotundato, tarsis dilatatis, ad apicem attenuatis; in ♀ angulo externo apicali tibiæ minus deletis, tarsis angustis parallelis. ♂ ædeago angusto, parallelo, ad apicem breviter rotundatim acuminato, longitudine et latitudine paramerum.

Habitat: Brasilia, Matto Grosso, Chapada, Aug.

Types in the Carnegie Museum and in my collection.

Easily distinguished by the numerous setigerous punctures dispersed on the discs of the elytra. Smaller in size than *G. cinctus* and its allies; similar to *G. tumidus*, but not so strongly convex and less compressed posteriorly. Distinguished furthermore by the broad tomentose borders of the elytra, which at the base are nearly as wide as the apical part of the pronotum. In this character it is like *G. oblongus*, which is, however, much more elongate and, moreover, distinguished by the sharp exterior apical angle of the anterior tibiæ.

13. *Gyretes globosus* sp. nov.

Long. 5.5—5.75 mm. Ovalis, brevis, postice parum attenuatus, valde convexus. Supra niger, nitidus, iridescens, flavo-marginatus. Infra piceus, pectore medio, ano, pedibusque ferrugineis; epipleuris flavis. Labro nigro, transverso, antice parum arcuato et flavociliato, supra punctato-piloso. Reticulatione superficiei fere nulla, margine tomentoso in pronoto, antice fere duplo latiore, in elytris ad humeros angustis-

simo, postice regulariter et sat fortiter dilatato, suturam vix ante apicem attingente. Truncatura elytrorum obliqua (in ♀ plus quam in ♂), leviter bisinuata, angulis suturali recto, parum rotundato, externo obtuso vix prominulo. Tibiis anticis triangularibus, in ♂ ad apicem oblique truncatis, angulo externo valde rotundato, tarsis dilatatis ovalibus, ad apicem attenuatis; in ♀ tibiis anticis recte truncatis, angulo apicali externo minus deleto, tarsis angustis. ♂ œdeago angusto, ad apicem regulariter acuminato, parameris paulo brevior et angustior.

Habitat: Brasiliã, Matto Grosso, Chapada, August.

Types in the Carnegie Museum and in my collection.

Very near to *G. burmeisteri* Ochs, having nearly its size and the same outline of the tomentose border of the elytra. *G. globosus* is, however, more convex, more broadly oval, and less attenuated posteriorly. It is distinguished furthermore by the shape of the male genitalia, the œdeagus being gradually narrowed in *G. globosus*, while in *G. burmeisteri* there is an evident constriction towards the apex and the tip is more finely acuminate.

In order to facilitate the determination of *Gyretes globosus* and its allies, which form together a group of very similar species, which are likely to be confounded, I am giving hereafter a key, which will suffice to distinguish the same.

KEY TO GYRETES CINCTUS GERMAR AND ALLIED SPECIES.

(Length 5.5—6.5 mm., side margin bordered with yellow).

1. Exterior apical angle of anterior tibiæ sharp; œdeagus very broad. 2
 Exterior apical angle of anterior tibiæ rounded; œdeagus much narrower. 3
2. Inner outline of the tomentose border of elytra concave posteriorly; lateral lobes of male genitalia robust. **cinctus* Germar.
 Inner outline of the tomentose border of elytra convexly curved posteriorly; lateral lobes of male genitalia thin. **dubius* Ochs.
3. Disc of prothorax strongly alutaceous (with round meshes); inner outline of the tomentose border of elytra strongly convexly curved behind
 **zimmermanni* Ochs.
 Disc of prothorax not, or only feebly, alutaceous; inner outline of the tomentose border of elytra regularly broadened behind. 4
4. Body very convex, short, oval, scarcely attenuated behind. . **globosus* Ochs.
 Body less convex, a little more elongate and more evidently attenuated behind. 5
5. Tomentose border of elytra generally only feebly broadened behind; œdeagus very narrow, parallel, only for a short distance rounded at the apex. **glabratus* Régimbart
 Tomentose border of elytra generally more broadened behind. 6

6. Anterior legs robust; œdeagus nearly as long as the lateral lobes, constricted and very finely acuminate apically (Brazil) **burmeisteri* Ochs.
 Anterior legs less robust; œdeagus shorter than the lateral lobes, parallel, somewhat narrowed and for a short distance rounded at the apex (Ecuador)
 **lojensis* Régimbart.

14. *Gyretes nitidulus* Laboulbène

Gyretes nitidulus Laboulbène, 1853, Ann. Soc. Ent. Fr., (3) I, pp. 53-57, t. I, ff. 2, 2a.

Gyretes nitidulus RÉGIMBART, 1883, Ann. Soc. Ent. Fr., (6), III, p. 397, t. II, f. 108.

Gyretes nitidulus RÉGIMBART, 1889, Ann. Mus. Civ. Genova, (2), VII, p. 268.

Gyretes nitidulus RÉGIMBART, 1891, Ann. Soc. Ent. Fr., LX, p. 687.

Gyretes nitidulus RÉGIMBART, 1907, Ann. Soc. Ent. Fr., LXXVI, p. 184.

Represented in the collection of the Carnegie Museum by a small series from Brazil (Arima, Rio Purús, Nov., 1922, Klages *coll.*), consisting of eight male specimens and six females, one of which is not alutaceous on the upper surface. In these specimens the labrum is bright red, moreover they are a little larger and especially broader than specimens from Surinam, which are generally abundant in collections. Although of the latter many specimens have been seen, there were not found among them any alutaceous females. A small series seen from Paraguay and Paraná contained no other than alutaceous females; the specimens from these localities are a little shorter and humerally slightly inflated, and in the males the alutaceous ground-sculpture of the upper surface is more evident. There are moreover small differences in the tomentose border of the elytra in the three forms, but it seems that this character is subject to individual variation. In the male genitalia, the œdeagus is narrower in specimens from Surinam than in those from Rio Purús, while it is still broader and apically constricted in specimens from the above mentioned southern localities. Nevertheless, all must probably be considered as forms of one species, the remaining essential characters being alike. The specimens from the Rio Purús are probably very near to, or perhaps identical with, the type, which was described from "Amazonas." The specimens which differ most are those from Paraguay and Paraná.

*These species are particularly treated and descriptions are given in a paper from me on *Gyretes*, which probably may appear in the "Revista Chilena," before this article is published.

15. *Orectogyrus patromimus* sp. nov.

Long. 7.25 mm. (ano excepto). *Ovalis, parum elongatus, postice oblique attenuatus, parum convexus. Supra niger, in medio nitidus, ad latera punctato-tomentosus, pubescentia aurea, anguste luteo-marginatus; infra piceus, pectore medio abdomine pedibusque, rufescentibus, margine inflexo elytrorum et pronoti flavo. Labro nigro, transverso, antice arcuato, punctato-piloso. Capite subtiliter reticulato (areolis rotundatis), utrinque ante oculos macula parva obscure rufa. Pronoto in medio subtiliter reticulato (areolis rotundatis), margine laterali tomentoso sat lato (dimidium oculi attingente), parallelo, spatio laevi trapeziformi. Elytris in medio reticulatione transversa vix visibili, margine laterali tomentoso antice pronoto vix latiore, ad duas partes parallelo, postea regulariter dilatato et suturam circiter ad quattuor partes attingente; spatio laevi elongato-ovali, postea acuminato. Truncatura obliqua, bisinuata, angulo auturali obtuso, leviter rotundato, externo acuto subspinoso. Tibiis anticis gracilibus, ad basin attenuatis, postea subparallelis, angulo externo apicali obtuso rotundato, tarsis angustis parallelis.*

Habitat: Kamerus, Lolodorf, Sept., 1913 (A. I. Good).

Type: 1 ♀ in the Carnegie Museum.

Somewhat recalls in general appearance *Orectochilus (Patrus) javanus* Aubé and its allies, and is in size and form near to *Orectochilus discifer* Walker. It is, however, a true *Orectogyrus*! Somewhat smaller and not so broad as *O. schönherri* Régimbart and without the red-colored pattern on the prothorax and elytra, by which the latter species is distinguished. The two species differ moreover, in several other characters. Smaller and less elongate in shape than *Orectogyrus mirabilis* Régimbart; the smooth part of elytra more extended apically in *O. patromimus*, the outer apical angle of elytra more prominent. The middle coxæ in *O. patromimus* are nearly as in *O. dorsiger* Régimbart (*Cf. Ann. Soc. Ent. Fr., (6) III, 1883, t. 13, f. 147a*).

16. *Orectogyrus grandis* Régimbart.

Orectogyrus grandis RÉGIMBART, 1891, Ann. Soc. Ent. Fr., LX, p. 715, t. 19, ff. 18, 18a.

Orectogyrus grandis RÉGIMBART, 1895, Mém. Soc. Ent. de Belg., IV, p. 231.

Orectogyrus grandis ZIMMERMANN, 1917, Ent. Mitt., VI, p. 169.

Mentioned by Régimbart from French Congo, Franceville (Gambey), Benito, Mont. de Cristal (Mocquers); by Zimmermann from Lolodorf, Kamerun. In my collection from Kamerun and Batanga (Poschet leg.). In the Carnegie Museum there is a series from Efulen, Kamerun: August and Sept., 1920, Dec. 27-30, 1920 (H. L. Weber

coll.). The specimens were captured together with specimens of *Dineutus micans serra*, *Orectogyrus specularis*, *O. conjungens* and *O. demeryi* var. *intermedius*. The Dresden Museum has a female specimen from Ashanti (*ex coll.* Felsche).

VIII. CELTIS MICROËNDOCARPICA BROOKS.
NOT A LITHOSPERMUM.

By BETTY WATT BROOKS.

(PLATE III.)

Some months ago the writer described and figured in the Annals of the Carnegie Museum specimens of a species of *Celtis*, which had been turned over to her for identification. The specimens were found by Mr. J. B. Hatcher in 1886, in the brain-case of a rhinocerotid, *Teleoceras fossiger* (Cope), and were obtained by the Carnegie Museum through exchange with the U. S. National Museum. The skull originally came from the "Loup Fork" Miocene of Philips County, near Long Island, Kansas.

Mr. Edward W. Berry¹ of the Johns Hopkins University, Baltimore, Maryland brought out a paper, which was published before mine² and therein described three new varieties of the genus and species, *Lithospermum fossilium* Berry. The material which was identified and described in Berry's paper was also collected by Mr. J. B. Hatcher from the "Loup Fork" formation.

In this paper I wish to point out the identity of *Lithospermum fossilium* var. *rugosum* Berry with *Celtis microëndocarpica* described by me in the paper above cited. The synonymy may be given as follows:

CELTIS MICROËNDOCARPICA BROOKS.

Celtis microëndocarpica Brooks, Ann. Carnegie Mus., Vol. XVIII, No. 2, 1928.

Lithospermum fossilium var. *rugosum* Berry, Proc. U. S. Natl. Mus. Vol. 73, art. 13, pp. 1-3, Pl. 1. May 1, 1928. = *Celtis microëndocarpica* Brooks.

non *Celtis rugosa* Willdenow, Species Plant. IV. 996, = *Trema rugosa*, Blume, Mus. Bot. Lugd. Bat. II. 63.

non *Celtis rugosa* Newberry, Proc. U. S. Natl. Mus., Vol. V, 1882, [1883], p. 510 = *Celtis lingualis* Knowlton and Cockerell.

non *Celtis rugosa* Rydberg, Bull. Torr. Bot. Club, 1912, XXXIX, 304, (Colorado) = *Celtis rugulosa* Rydberg, Flora Rocky Mountains, 207 (1917).

non *Celtis rugosa* Chevall, Expl. Bot. Afr. Occ. Franc., I, 589, 1920 (Cote d'Ivoire).

¹ Berry, E. W., *Fossil nutlets of the Genus Lithospermum*. Proc. U. S. Natl. Mus. Vol. 73, Art. 13, pp. 1-3, With pl. 1. May 1, 1928.

² Brooks, Betty Watt, *A New Species of Fossil Hackberry (Celtis) from the "Loup Fork" Miocene of Philips County, Kansas*. Annals of Carnegie Museum, Vol. XVIII, No. 2, May 31, 1928.

The seeds described by Berry do not belong to the genus *Lithospermum*, but to the genus *Celtis* as I maintained. I wish to emphasize the fact that I am only concerned with Berry's species *Lithospermum fossilium* var. *rugosum*. The two other varieties that he has described, *Lithospermum fossilium* var. *glabrum* Berry and *Lithospermum fossilium* var. *aristatum* Berry, I am content to leave as he identified them.

In my earlier paper I made a very careful study of the fossil nutlets of *Celtis* and compared them with nutlets from some of our present day species of *Celtis*. Microscopic examination, drawings, and photographs, proved clearly that the "reticulate ridges that divide the surface of the nutlets into many small polygons, and which in turn are divided by a network of finer ridges" ³ present a very definite character, and one which in my judgment is quite specific for both the fossil and the living species. (Pl. III, figs. 1-9 and 14-19).

Although Mr. Berry feels that "smoothness and rugosity" ⁴ are not very good specific characters, I believe that it is rather far fetched to draw a comparison, as he has done, between the pitted type of seed and those with a definite pattern of reticulate ridges. The figures of *Celtis* (Pl. III, figs. 1-9, 14-19) uphold this statement.

The most outstanding character which distinguishes the fossil nutlets from the living forms is size. Both of the species of *Celtis* which are common in North America today, *Celtis occidentalis* Linnaeus, and *Celtis mississippiensis* Bosc, as well as some of the less common species, *Celtis anfructosa* Liebmann, *Celtis pallida* Torrey, *Celtis reticulata* Torrey, and *Celtis crassifolia* Lamark, (see figs. 14-19) have nutlets which are decidedly larger than the fossil nutlets, which average two millimeters at the basal end and one millimeter at the pointed apical end (see figs. 1-9). The seeds of *Lithospermum* with which Berry has compared the fossil nutlets are also larger and therefore size cannot stand as a specific character (See Pl. III, figs. 10-13). The shape of the fossil nutlets of *Celtis* is more or less oval, and although superficially they are somewhat similar to the seeds of *Lithospermum* their characteristic reticulated surfaces show them to be distinct.

On the basis of the definite pattern which marks the surface of the

³ Brooks, Betty Watt, *Ibid.*

⁴ Berry, E. W., *Stones of Celtis in the Tertiary of the Western United States*. Amer. Mus. Novitates, No. 298, Feb. 3, 1928.

fossil nutlets, and the close resemblance which they bear in their reticulate pattern to the seeds of living species of *Celtis*, I am forced to regard the species *Lithospermum* var. *rugosum* Berry, as a synonym of *Celtis microëndocarpica* Brooks. The two other seeds described by Berry will remain as *Lithospermum fossilium* var. *glabrum* Berry, and *Lithospermum fossilium* var. *aristatum* Berry.

In conclusion I wish to thank Mr. Sydney S. Prentice for his kind and skilful preparation of the plate accompanying this paper.

EXPLANATION OF PLATE.

Figs. 1-9. *Celtis microëndocarpica* Brooks. Nutlets from "Loup Fork" Miocene of Philips County, Kansas. X 5.6.

Figs. 10-13. *Lithospermum linearifolium* Goldie. Nutlets of the existing species. Ozark Region, Arbuckle Mts., Davis, Okla. X 6.5

Figs. 14-19. Nutlets of living species.

14. *Celtis mississippiensis* Bosc. From Mississippi Valley. St. Louis, Mo. X 6.

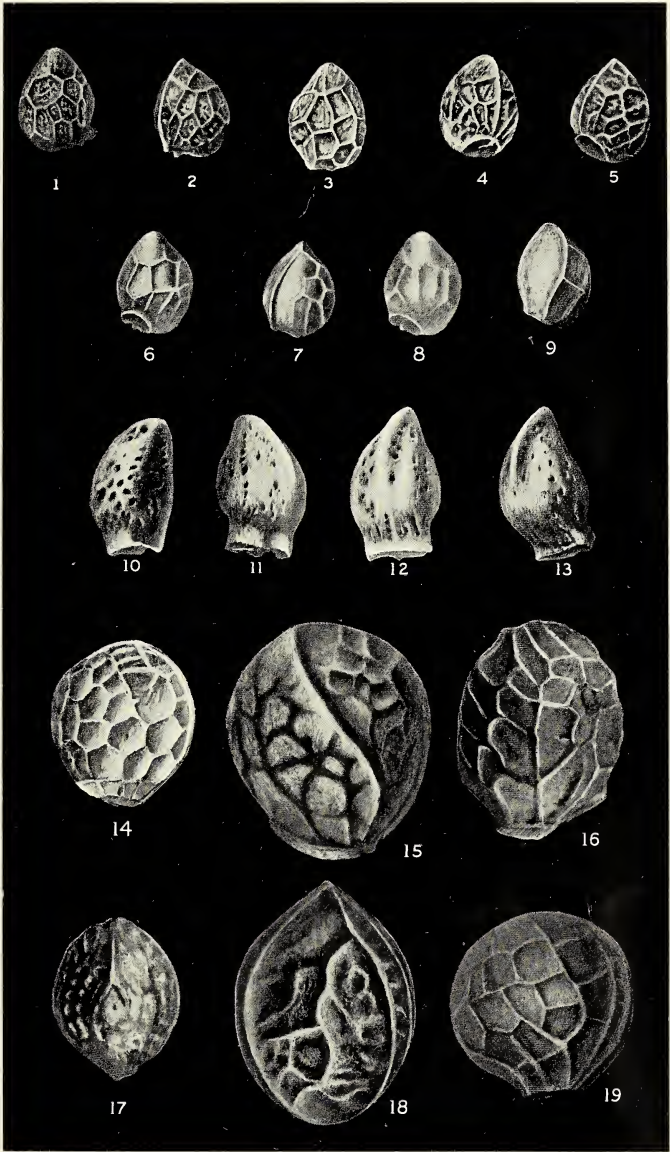
15. *Celtis occidentalis* Linnæus. From Beltzhoover Park, South Side, Pittsburgh, Pa. X 6.

16. *Celtis anfructosa* Liebmann. From Santa Marta, U. S. of Colombia. X 6.

17. *Celtis pallida* Torrey. From Fort Hills, Arizona. X 6.

18. *Celtis reticulata* Torrey. From bank of Columbia River, Klichitat Co., Washington, X 6.

19. *Celtis crassifolia* Lamark. From Cedar Point, Sandusky, Ohio. X 6.



For explanation see opposite page.

IX. A LIST OF PRIONID BEETLES TAKEN AT KARTABO,
BARTICA DISTRICT, BRITISH GUIANA, WITH THE
DESCRIPTION OF A NEW SPECIES.

BY SAMUEL H. WILLIAMS,
Professor of Zoölogy, University of Pittsburgh.

(PLATES IV-V).

In presenting the following list of *Prioninæ*, the writer does not wish to suggest that the species mentioned are all of those which may be found at Kartabo. The list only enumerates those which actually have been found there. The list has been based upon the collections of the writer made from June to October, 1925, and from July to October, 1927, and the somewhat heterogenous collection of the New York Zoölogical Society, which in no way represents an intensive survey. The specimens in the last named collection were taken at random by various members of Dr. Beebe's parties, who were mainly interested in other fields of research. The only systematic records available are those made by the writer.

While several of the species mentioned are represented during most of the year at Kartabo, there are doubtless many others present in seasons when no survey was made. The writer has experienced too many difficulties in jungle-studies to assume that he collected all of the species present during the months of his stay at Kartabo. Other forms taken elsewhere in British Guiana, and which are undoubtedly to be found at Kartabo, are not included in the list, which is strictly confined to Kartabo.

The writer is at a loss to explain the entire absence of many well known genera, which are abundant in the region of the Orinoco to the northwest and in the two Guianas to the southeast. However, it would require a long period of time to exhaust the resources of Kartabo.

Certain forms are either scarce or difficult to find. For instance, in all the years of investigation at Kartabo, only one specimen of *Macrodontia cervicornis* has been taken, and that dropped from above and landed at the writer's feet. Such a large and conspicuous form,

were it abundant, would be well represented in the general collection, because no student, regardless of his interests, could overlook such a striking form.

Like the mammals, the beetles seem to be abundant in an inverse ratio to their size. Due to the fact that many of them are not active, flying forms, their detection is largely a matter of chance. Then, too, some sap-drinking forms remain in the upper regions of the larger trees, while still others remain concealed during the hours of daylight and are chiefly about at night, so that they are not easily obtained. An attempt was made to ascertain the periods of activity of the various forms and the results of these studies made it possible to obtain abundant material in many cases.

In attempting a systematic survey, the writer collected intensively at all hours of the day and night. Light screens and every sort of trapping device were used. Carcasses of mammals, serpents, lizards, and various kinds of excrement were used for bait. Frequently, in the darkness of night, some form would noisily fly past, and by quick use of the flash and net many such forms were taken. But attempts to secure biological data as to these did not usually meet with much success. To secure such data in most cases would require long residence and incessant effort.

There is no doubt that the coleopterous fauna of Kartabo is large, and the writer is convinced that the present list represents only a small percentage of the number of *Prioninæ* to be found there; it is offered only as a contribution to our knowledge of the fauna of that one locality.

In attempting to complete the study of the *Cerambycidæ* of the Kartabo District, the writer has exhausted every resource. Original descriptions, distributional records, and many types have been examined. The identified collection has been checked against the museum collections both in Europe and America. The absence of many species from the collections of large museums (particularly of *Lamiinæ* and *Cerambycinæ*) indicates the fertility of British Guiana for systematic work.

The difficulties encountered in making a systematic survey of a new region are apt to convert the student to some of the various theories of classification on mathematical or other bases. The examination of bulky bibliographies and failure to secure access to im-

portant but rare papers, make systematic work rather tiresome and discouraging, and emphasize the need of monographic works.

The tendency of some workers to visit a comparatively unknown region for a short time, and then to assume that all forms taken must be new, is to be frowned upon. There is a tendency toward greater conservatism in the creation of new species than was formerly the custom. The conservative student, having experienced so much discouragement in eliminating synonyms, will welcome anything that may tend to reduce his labors. The overlapping of Amazonian and Central American faunæ in British Guiana makes extreme caution necessary in listing forms from that region.

In the synonymy of the species in this paper I have closely followed that given by Lameere in the *Junk-Schenkling Coleopterorum Catalogus*, supplemented by the more extended paper which the same author has given us in the *Genera Insectorum*, fasc. 172, 1919.

The writer wishes to take this opportunity to express his appreciation of the courtesies extended by Professor Dr. Ferdinand Pax and his associates at the Zoölogisches Institut und Museum in Breslau; Mr. G. K. Arrow and his associates at the British Museum of Natural History; Professor Dr. H. Kuntzen at Berlin; Dr. Hugo Kahl, Curator of Entomology at the Carnegie Museum; and to Dr. William Beebe, whose splendid coöperation added to the pleasure of studying at Kartabo. Dr. W. J. Holland, of the Carnegie Museum, has, as heretofore, been generous in placing his private library at the writer's command, as well as in aiding me in the preparation of this paper for the press.

It would be a breach of courtesy to fail to express my appreciation of the many favors granted by the officials of the Aluminum Company of America and their South American representatives, who generously aided me in many ways.

Family CERAMBYCIDÆ.

SUBFAMILY PRIONINÆ.

Group II MACROTOMINI Lameere.

Genus STENODONTES Serville.

Stenodontes SERVILLE, Ann. Soc. Ent. France, I, 1832, p. 175.

Subgenus *Mallodon* Serville.

Mallodon SERVILLE, Ann. Soc. Ent. France, I, 1832, p. 176.

Three forms of this interesting genus have been found at Kartabo. There is some variation within each species, especially in size and color. They are active at night and are attracted to light. During the day they rest beneath loose bark, or in excavations made by their larvæ, which live in wood. The adults are never found among the foliage. The largest species, *M. spinibarbe*, is the commonest.

1. ***Mallodon spinibarbe*** (Linnæus). Pl. IV, fig. 1, ♂.

- Cerambyx spinibarbis* LINNÆUS, Syst. Nat., Ed. X, 1758, p. 390.
Armiger frangens (♀) VOET, Cat. Col., II, 1778, p. 2, pl. I, f. 2.
Armiger miles (♂) VOET, l. c., p. 2, pl. I, f. 3.
Prionus maxillosus OLIVIER, Entomologie, IV, 1795, p. 16, pl. I, f. 3.
Prionus dentatus FABRICIUS, Syst. Eleuth., II, 1801, p. 263.
Prionus similis SCHNÆHERR, Sys. Ins., I, 3, 1817, p. 345.
Prionus geginus GERMAR, Ins. Spec. Nov., 1824, p. 468.
Mallodon germari THOMSON, Physis, I, 1867, p. 100.
Mallodon subcancellatus THOMSON, l. c., p. 102.
Mallodon bonariense THOMSON, l. c., p. 99.
Mallodon d'orbigny THOMSON, l. c., p. 101.
Mallodon spinibarbis LAMEERE, Mém. Soc. Ent. Belg., IX, 1902, p. 75; in JUNK-SCHENKLING, Col. Catal., Pt. 52, 1913, p. 12; Gen. Insect., fasc. 172, 1919, p. 32.

This species is the largest of the genus, and by far the commonest at Kartabo. About one hundred and fifty specimens were collected by me during my two visits to that locality.

2. ***Mallodon dasystemum*** (Say).

- Prionus dasystemus* SAY, Journ. Acad. Sci. Phila., III, 1823, p. 326.
Mallodon melanopus HALDEMAN, Trans. Am. Phil. Soc., X, 1847, p. 31.
Mallodon spinibarbe HALDEMAN, l. c.
Mallodon costulatum LECONTE, Journ. Acad. Nat. Sci. Phila. (2) II, 1852, p. 111.
Mallodon dasystemum LECONTE, l. c., p. 112.
Mallodon dasystemus LAMEERE, Mém. Soc. Ent. Belg., IX, 1902, p. 79; in JUNK-SCHENKLING, Col. Catal., Pt. 52, 1913, p. 12; Genera Insect., fasc. 172, 1919, p. 32.

SUBSPECIES.

- a. *Mallodon dasystemus masticator* THOMSON, Physis, Vol. I, 1867, p. 99. (Columbia to Mexico); LAMEERE, Mém. Soc. Ent. Belg., IX, 1902, p. 70; in JUNK-SCHENKLING, Col. Catal., Pt. 52, 1913, p. 12; Gen. Insect., fasc. 172, 1919, p. 32.
angustatus THOMSON, l. c., p. 100; BATES, Biol. Cent.-Amer., Vol. V, 1879, p. 9, l. c., 1884, p. 236.
degeneratus THOMSON, l. c., 1867, p. 95.
 ? *debilis* CASEY, Mem. Col., V, 1912, p. 222.

- b. *Mallodon dasytomus plagiatus* THOMSON, l. c., p. 95; LAMEERE, Mém. Soc. Ent. Belg., IX, 1902, p. 80; in JUNK-SCHENKLING, Col. Catal., Pt. 52, 1913, p. 12; Gen. Insect., fasc. 172, 1919, p. 32.
- c. *Mallodon dasytomus bajulus* ERICHSON, Archiv. f. Naturg., XIII, 1847, p. 138. *occipitalis* THOMSON, l. c., p. 92. *chevrolati* THOMSON, l. c., p. 94. *columbianus* THOMSON, l. c., p. 98.

Genus PROTORMA Waterhouse.

Protorma WATERHOUSE, Ann. & Mag. Nat. Hist. (5) V, 1880, p. 288; LAMEERE, Ann. Soc. Ent. France, LXXXIV, 1915, p. 283 (? = gen. *Strongylaspis*); in JUNK-SCHENKLING, Col. Catal., Pt. 52, p. 14; Gen. Insect., fasc. 172, 1919, p. 26.

3. *Protorma recurvatum* sp. nov. Pl. V. fig. 1, ♂.

♂. Dull, rusty brown, the head and thorax only slightly darker than the elytra; the body beneath somewhat darker; head, thorax, and elytra very finely rugose; thorax almost twice as broad as long, not very convex, very obliquely narrowed anteriorly, the posterior portions of the lateral borders strongly recurved and extending, ending in a blunt, somewhat obtuse spine on each side at the posterior angles; sides of the thorax crenulate. Posterior margin of the thorax emarginate with a small tooth on each side of the middle and a short sunken line extending forward from the middle, forming two rather distinct lobes; elytra covered with scattered, short, almost invisible hairs; as wide as the thorax at their base, but slightly narrowed posteriorly; sutural angle without spines, but fringed with hair; each elytron with four costæ, the first and second nearly parallel and extending nearer to the apex than the others; epipleural fold channelled for its entire length; legs robust, rugose, the femora and tibia quite compressed; posterior femora less rugose above; first tarsal segment as long as the second and third united; the fourth not quite as long as the other three united; abdomen shining, very feebly punctured. *Length*, 4.3 cm.

The specimen was taken in flight at the edge of a small clearing at dusk. It was carefully compared by me with the type of *Protorma scabrosa* Waterhouse, from which it is quite distinct.

Genus MACRODONTIA Serville.

Macrodontia SERVILLE, Ann. Soc. Ent. France, I, 1832, p. 139; GORY, Ann. Soc. Ent. France, VIII, 1839, p. 124; LACORDAIRE, Gen. Col., VIII, 1869, p. 78; LAMEERE, Ann. Soc. Ent. Belg., XLVIII, 1904, p. 342.

4. *Macrodontia cervicornis* (Linnæus). Pl. IV, fig. 3. ♂.

Cerambyx cervicornis LINNÆUS, Syst. Nat., Ed. X, 1758, p. 389.

Prionus cervicornis FABRICIUS, Ent. Syst., 1778, p. 161; OLIVIER, Entomologie, IV, 1795, p. 13, pl. II, fig. 8; PALISOT DE BEAUVOIS, Insect. Rec. en Afrique et Amerique, p. 215, pl. XXXIV, fig. 1.

Macrodontia cervicornis SERVILLE, Ann. Soc. Ent. France, I, 1832, p. 140; CASTELNAU, Hist. Nat., II, 1840, p. 390, pl. 25; LAMEERE, Ann. Soc. Ent. Belg., XLVIII, 1904, p. 333; in JUNK-SCHENKLING, Col. Catal., Pt. 52, 1913, p. 16; Gen. Insect., fasc. 172, 1919, p. 92.

A single specimen was taken at Kartabo, although the writer collected a number of specimens at other places in British Guiana. The species is usually found within cavities in trees during the day. At night they walk about and seldom take wing. Their flight is noisy, awkward, and of short duration.

Genus *JALYSSUS* Thomson.

Jalyssus Thomson, Syst. Ceramb., 1864, p. 296.

5. *Jalyssus tuberculatus* (Olivier). Pl. IV, fig. 2. ♀.

Prionus tuberculatus OLIVIER, Entomologie, IV, 1795-6, p. 20, pl. VI, fig. 32.

Ctenoscelis tuberculatus SERVILLE, Ann. Soc. Ent. France, I, 1832, p. 135.

Mecosarthron tuberculatus BUQUET, Ann. Soc. Ent. France, XII, 1843, p. 239.

Jalyssus tuberculatus THOMSON, Syst. Ceramb., 1864, p. 297; BATES, Trans. Ent. Lond., XVII, 1869, p. 45; LAMEERE, Mém. Soc. Ent. Belg., XI, 1903, p. 67; in JUNK-SCHENKLING Col. Catal., Pt. 52, 1913, p. 33; Gen. Insect., fasc. 172, 1919, p. 29.

This is apparently an uncommon form, only one specimen having been taken at Kartabo. It is also rare in Museum collections where it is usually listed under the genus *Pyrodes* or *Mecosarthron*.

It is distinctly different from *Mecosarthron*, however, in that the third antennal segment is longer than the fourth.

Group III CALLIPOGONINI.

Genus *CALLIPOGON* Serville.

Callipogon Serville, Ann. Soc. Ent. France, I, 1832, p. 140.

Subgenus *Orthomegas* Serville.

Orthomegas Serville, l. c., p. 149.

6. *Orthomegas cinnamomeus* (Linnæus). Pl. IV, fig. 4, ♂.

Cerambyx cinnamomeus LINNÆUS, Syst. Nat., Ed. X, 1758, p. 389.

Prionus cinnamomeus DRURY, Ill. Ins., I, 1773, p. 89, pl. XL, fig. 2; FABRICIUS, Systema Ent., 1775, p. 183.

Prionus mucronatus FABRICIUS, Systema Ent., 1775, p. 160.

Prionus cinctus VOET, Col. Catal., II, 1778, p. 16, pl. XV, fig. 60.

Prionus corticanus OLIVIER, Encycl. Méth., V, 1790, p. 294; Entomologie, IV, 1795, p. 21, pl. IX, fig. 34; CASTELNAU, Hist. Nat., II, 1840, p. 401.

Prionus spadiceus DALMAN, in SCHÖNHERR, Syn. Ins., I, 3, Appendix, 1817, p. 148.

Orthomegas cinnamomeus SERVILLE, Ann. Soc. Ent. France, I, 1832, p. 149; BATES, Trans. Ent. Soc. Lond., XVII, 1869, p. 41; Biol. Cent.-Amer., Vol. V, 1884, p. 232; LAMEERE, Ann. Soc. Ent. Belg., XLVIII, 1904, p. 62; in JUNK-SCHENKLING, Col. Catal., Pt. 52, 1913, p. 52; Gen. Insect., fasc. 172, 1919, p. 85.

Both the larger and the smaller forms occur in abundance at Kartabo, where they are attracted in numbers to lights. Several specimens were taken during the day, as they rested on the bark of trees in the dense woods.

Group IV DERANCISTRI.

Genus PYRODES Serville.

Pyrodes SERVILLE, Ann. Soc. Ent. France, I, 1832, p. 186; LAMEERE, Mém. Soc. Ent. Belg., Vol. XVII, 1909, p. 37.

Subgenus *Esmeralda* Thomson.

Esmeralda THOMSON, Classific. Cerambyc., 1860, p. 303; LACORDAIRE, Gen. Col., VIII, 1869, p. 178; LAMEERE, Mém. Soc. Ent. Belg., XVII, 1909, p. 57; *ibidem* Vol. XXI, 1912, p. 171; Gen. Insect., fasc. 172, 1919, p. 104.

7. *Esmeralda auratus* (Linnæus). Pl. V, fig. 2, ♂; fig. 3, ♀.

Cerambyx auratus LINNÆUS, Syst. Nat., Ed. X, 1758, p. 395.

♀ *Cerambyx bifasciatus* LINNÆUS, Syst. Nat., Ed. XII, 1767, p. 624.

Prionus bifasciatus FABRICIUS, Systema Ent., 1775, p. 162; OLIVIER, Entomologie, IV, 1795, p. 32, Pl. IV, figs. 4a, b.

Prionus amazonus FABRICIUS, Syst., Eleuth., 1901, p. 202.

Cerambyx amazon VOET, Col. Cat., II, 1806, p. 9, pl. III, fig. 9.

ab. *nodicornis* (Bates).

Pyrodes nodicornis BATES, Trans. Ent. Soc. Lond., XVII, 1869, p. 53.

Esmeralda auratus LAMEERE, Mém. Soc. Ent. Belg., XVII, 1909, p. 60; Gen. Insect., fasc. 172, 1919, p. 104.

VARIETIES.

- a. *Esmeralda auratus nigricornis* GUÉRIN.
Pyrodes nigricornis GUÉRIN, Verh., Zool.-Bot. Ges., Wien, V, 1855, p. 598;
 BATES, Trans. Ent. Soc. Lond., 1869, p. 53; LAMEERE, Mém. Soc. Ent.
 Belg., Vol. XVII, 1909, p. 59; Gen. Insect., fasc. 172, 1919, p. 104.
Rubrozonatus (Lucas).
Pyrodes rubrozonatus LUCAS, Voy. Castelnau, 1859, p. 180, pl. II, fig. 2, ♂.
 var. *Candezei* (Lameere).
Pyrodes candezei LAMEERE, Ann. Soc. Ent. Belg., XXIX, 1885, Bull. p. xii,
 ♀; Gen. Insect., fasc. 172, 1919, p. 104.
- b. *Esmeralda auratus gratiosus* Bates.
Pyrodes gratiosus BATES, Trans. Ent. Soc. Lond., XVII, 1869, p. 51; LAMEERE,
 Mém. Soc. Ent. Belg., Vol. XVII, 1909, p. 59.
Esmeralda insignis NONFRIED, Ent. Nachr., XX, 1894, p. 136, ♂.

The female of this species is quite beautiful. The broad elytra are brilliantly colored with a reddish pink and have a large diamond-shaped area in the middle which is bluish green. There is also a transverse, bluish band across the apices of the elytra. The head and thorax are green, while the under side of the body as well as the legs are blue and shining. The male is much smaller than the female and is usually of a nearly uniform color which is bronze, reflecting green. The legs of the males are usually prominently marked with pink and blue.

Group V PRIONINI.

Genus DEROBRACHUS Serville.

Derobrachus SERVILLE, Ann. Soc. Ent. France, Vol. I, 1832, p. 154.

8. *Derobrachus agyleus* Buquet.

Derobrachus agyleus BUQUET, Ann. Soc. Ent. France, (2) X, 1852, p. 657; LAMEERE,
 Ann. Soc. Ent. Belg., LV, 1911, p. 268; Gen. Insect., fasc. 172, 1919, p. 124.

A single example of this species was obtained. It was brought to me by a servant who reported that he had found it on the ground at the base of a Mora tree.

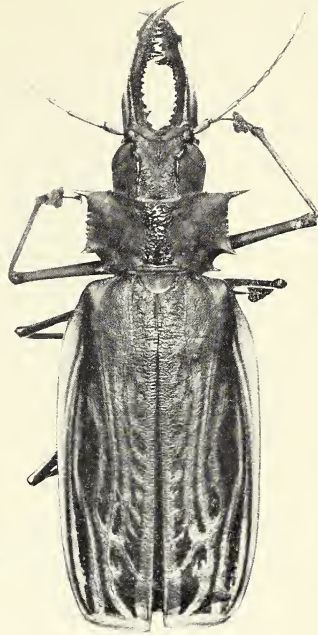
EXPLANATION OF PLATE IV.

(All figures two-thirds natural size.)

- Fig. 1. *Mallodon spinibarbe* (Linnæus) ♂.
Fig. 2. *Jalyssus tuberculatus* Thomson, ♀.
Fig. 3. *Macrodonia cervicornis* (Linnæus) ♂.
Fig. 4. *Orthomegas cinnamomeus* (Linnæus) ♂.



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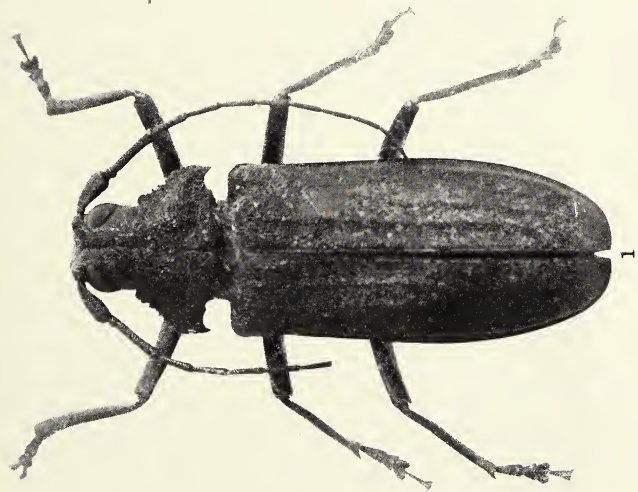


2



4

For explanation see opposite page.



1



2



3

1. *Protorma recurvatum* sp. nov., ♂. Type, nat. size.
2. *Esmeralda auratus* (Linnaeus) ♂, nat. size.
3. *Esmeralda auratus* (Linnaeus) ♀, nat. size.

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*Issued as separates, Mar. 23, 1929

†Issued as separate, Apr. 5, 1929

**Issued as separate, May 14, 1929

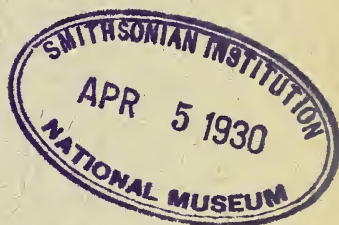
††Issued as separate, May 22, 1929

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Serial No. 144

ANNALS
OF THE
CARNEGIE MUSEUM



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ANNALS

OF THE

CARNEGIE MUSEUM

VOL. XIX, No. 3

EDITORIAL NOTES.

The celebration of Founder's Day at the Carnegie Museum took place on the afternoon of October 17th. The principal speaker was Commander Donald B. MacMillan, arctic explorer, who in his address outlined the progress of discovery in polar regions. His interesting recapitulation did not fail to impress his audience with the genuine importance of the additions which have been made to human knowledge by the daring investigations carried on by several generations of intrepid explorers, many of whom risked their lives and some of whom lost their lives in the effort to advance the boundaries of human knowledge as to the lands which lie at the top and bottom of our globe.

Since addressing his great audience on Founder's Day Captain MacMillan on December 15th lectured in the Sunday Afternoon Free Lecture Course of the Museum. His subject was "Under the Northern Lights." The lecture was illustrated, and, as was to be expected, the Lecture Hall of the Museum was packed to capacity and more persons were turned away than the number of those who found seats. Capt. MacMillan certainly proved his popularity as a public speaker on both occasions.

Speaking of Arctic exploration and explorers I recall an incident, which occurred in London in the spring of the year 1905, and which I hold in pleasant remembrance.

I was engaged in installing the replica of *Diplodocus carnegiei* in the Gallery of Reptiles in the British Museum. The place assigned to the

replica had been fenced off by movable screens, several of which had glass windows. While standing in front of one of these screens I saw a very venerable man endeavoring to peer through the glass, evidently filled with curiosity as to what was going on. Something in his appearance showed me that he was not an ordinary person. Pushing the screen aside, I came out, saluted him, and asked him whether he was interested in what was going on. He replied, "I am profoundly interested." I introduced myself to him by name telling him that I was in charge of the work and invited him to come behind the screen. I ventured to ask him his name. He replied, "I am Admiral Sir Francis Leopold McClintock." I immediately answered, "What! Are you Admiral McClintock who commanded 'The Fox' on the voyage on which the fate of Sir John Franklin was ascertained?" He replied, "I am the man." I answered, "I certainly am honored in meeting you and in forming your acquaintance. I have the account of the voyage, which you wrote, in my library. Since I was a child I have been interested in arctic exploration and explorers and have known many of those who have ventured into the north." He smiled, took the chair, which I proffered him, and resting his hands upon his cane sat with me for half an hour asking questions about the skeleton, which we were placing in position. I in turn occasionally asked him questions as to his arctic experiences, which he most affably answered. Admiral McClintock at that time was in his eighty-sixth year. He died two years later in the eighty-eighth year of his age. When I made his acquaintance he was easily the oldest in years of all those whose names are linked with the discovery of polar lands.

Mr. J. LeRoy Kay returned to the Museum on December 1st after a successful summer and fall spent in recovering a large quantity of mammalian fossils discovered by him about eleven miles west of Vernal, Utah. The large shipment which he made before starting on his return to Pittsburgh has been received and the preparators in the paleontological section are busily at work extracting the bones from the matrix in which they are imbedded.

From August 12th to September 9th we had the pleasure of having on view an exhibit of ceramic art kindly placed at our command by the American Federation of Arts. The exhibit was visited by a multitude

of persons who derived at once pleasure and instruction from what was placed on view.

Signor Commendatore Michele Conte of Rome has most graciously presented to the Museum four bronze medallions of large size mounted on porphyry. These medallions were executed by A. Mistruzzi, the celebrated sculptor, at the expense of Commendatore Conte. The largest medallion commemorates the flight of the airship Italia to the North Pole; the second represents Dante; the third King Vittorio Immanuele III; the fourth Benito Mussolini. The presentation of this gift was made by the Italian Vice-Consul in Pittsburgh, Signor Giovanni Giurato, on November 4th, and was accepted in behalf of the Museum by Dr. Avinoff, the Director, in the presence of a deeply interested audience.

Mr. Herbert W. Graham, for some time associated with this Museum, and a member of the scientific staff of the non-magnetic ship "Carnegie," was kindly authorized by the Carnegie Institution of Washington at such times as were at his command for such work to make botanical and zoölogical collections for the Carnegie Museum. Mr. Graham arrived in Pittsburgh on leave on December 22d and the Editor in a brief interview with him learned to his sorrow that his extensive botanical collections made in the Sandwich Islands and in Samoa, together with extensive collections of lepidoptera made in Samoa were on board the ship when it was destroyed. Mr. Graham says that he made a large collection of moths and butterflies in Samoa and found insect life quite abundant, but everything has gone up in smoke. That is that!

In 1927 the children of America sent to the children of Japan twelve thousand seven hundred and thirty-nine dolls as messengers of friendship. The action of the children of America has been reciprocated by the children of Japan and on October 12th "Miss Kochi," a gorgeous and beautifully dressed doll, sent by our Japanese friends, was welcomed by the children of Pittsburgh at Carnegie Lecture Hall. A play in which the actors were all children in Japanese costumes was presented under the efficient leadership of Dr. Will Earhart, Director of Music, and Miss Sara Marie Herbert, Supervisor of Music, the latter having composed the melody and words of all the songs.

The pupils of the J. M. Logan School developed the dances. The John Morrow School and the Western Pennsylvania School for the Blind made the decorations. The children of the Community, Shearer, Frick Training, Peabody High and Friendship Schools contributed actors and assistant authors, who produced and presented the play.

"Miss Kochi," the doll Ambassadors of Good-will and Friendship from Japan, was received with distinguished courtesy and attention.

A full account of this ceremony appears in the Carnegie Magazine, Vol. III, Pt. 7, pp. 218-19.

The annual meeting of the American Association of Museums, held in Philadelphia May 21-24th, 1929, was attended by Dr. Avinoff the Director, Dr. O. E. Jennings, Mr. Sydney Prentice, Mr. Remi H. Santens, and Miss Jane White. Their report of the proceedings was highly interesting.

The photographic dark-room has been thoroughly renovated, and under the care of Mr. Prentice is adapted to better work than has ever been done therein.

On the evening of December 14th messages and greetings were broadcast over KDKA to our friend, Mr. George Miksch Sutton, who is spending the winter among the Esquimos on Northampton Island, in Hudson Bay. We trust that the messages were duly received by him.

Our good friend, Mr. Charles D. Armstrong, has just made a very handsome present to the Museum, consisting of a complete breakfast service in Sevres, which formerly belonged to and was used by King Louis Philippe of France.

Two of the most beautiful groups ever executed in the Museum were placed on public view on Founder's Day, October 17th.

In the Gallery of Mammals there was exhibited on that day for the first time a group representing the American Prong-horned Antelope. The group represents a number of finely mounted animals dashing away into the distance through the sage-brush. Representations of animals in motion is an extremely difficult undertaking, but Mr. Santens with remarkable ingenuity has achieved very life-like results.

The background by Mr. Ottmar Fuehrer is admirably conceived and executed. The environment of the specimens is very true to life and vividly recalls to mind scenes familiar to the writer when in the past he led the life of a fossil-hunter on the wide plains of Wyoming and adjacent states.

The other group is in the Gallery of Plants and represents the vegetable life of the desert regions of Arizona, in which the giant cacti play the most important rôle. The group was composed and assembled by Mr. Fuehrer, who visited the region himself, made casts of the cacti, which he has cunningly again clothed with green and on which he has placed the spines at the very points from which he originally removed them. Without exception we believe this to be the most carefully and beautifully executed group of its kind in existence anywhere in the world at the present time.

Through the kindness of Mr. James H. Lockhart a sum of money has been given to the Museum for the purpose of enabling Professor Ludwig Fuehrer to make a collection of birds for the Carnegie Museum in the Balkans. Our collection of European birds is mainly composed of material obtained in western Europe. Now by the thoughtful kindness of Mr. Lockhart we will be able no doubt to greatly increase it by representative species from the southeastern parts of that continent.

Carnegie Museum.
December 24, 1929.

X. NEW SPECIES AND VARIETIES OF NORTH AMERICAN BUTTERFLIES.

BY W. J. HOLLAND.

Family PAPILIONIDÆ.

SUBFAMILY PARNASSIINÆ.

Genus PARNASSIUS.

Parnassius golovinus Holland, sp. nov.

♂. Recalling *Parnassius delius* Esper, but distinguished on the secondaries by the presence of a band of dark submarginal sagittate spots and a much heavier inward extension of the black band of the same wing which runs along the upper three-fourths of the inner margin and is produced inwardly along the under side of the cell. This black band is followed below by a heavy black wedge-shaped bar, which extends from the inner margin above the anal angle as far as the first median nervule. On the under side the markings are paler, the black band along the inner margin is obscure and at the base covered by three large crimson spots. On this side the black bar above the anal angle of the hind wing is pupilled with crimson spots.

♀. On the upper side the transverse marginal, submarginal, and extradiscal spots are much darker and more diffuse than in the male. The extradiscal band of dark spots is accentuated below the costa by two crimson spots encircled by black, which are far more conspicuous than the corresponding spots in the male, in which sex they are often wanting. The secondaries are broadly margined externally by dark fuscous, melting into and fusing with the submarginal band of black spots, which appear in the male; the black bar above the anal angle fuses with the black internal area and coalesces with the black margin of the large crimson ocellus below the cell. On the under side the markings of the upper side are repeated as in the male, but paler. The supra-anal bar is represented by three triangular crimson spots bordered outwardly by black and pupilled with white. Expanse: ♂, 60 mm.; ♀, 65 mm.

This is the Alaskan form of *delius* Esper. It is represented in my

collection by a series of specimens collected at Golovin Bay and at other points not far distant.

Family NYMPHALIDÆ.

SUBFAMILY NYMPHALINÆ.

Genus MELITÆA Fabricius.

Melitæa gilensis sp. nov.

The transverse bands and spots on the upper side resemble in a general way those of *M. minuta*, but are fainter, the ground-color a very pale buff. On the under side the entire surface is pale whitish with almost no contrast between the ground-color and the transverse bands which are a shade paler than the ground-color, pearly white, and laterally defined by faint darker lines. The location and outline of these bands recalls that which is found in the species of the *Didyma*-group (*arachne* Edw., *pola* Boisd., *nympha* Edw.), but there is an entire absence of the minute black dots, or punctulations, which are characteristic of all the species of that group.

The type, which has long stood in the Mead Collection in my possession was taken by the Wheeler Expedition and is ticketed as from "Ft. Gila," in southern Arizona. The type will be figured in the forthcoming Revised Edition of *The Butterfly Book*.

Melitæa arachne Edwards, ab. **gunderiæ** ab. nov.

I take pleasure in naming a remarkable aberration of *M. arachne* in honor of the good wife of my esteemed friend, Mr. Gunder, which is characterized by having a very dark brown mesial band on the secondaries, replacing the light spots of the mesial band found in normal specimens. The type is a female. In naming this aberration I depart a little from my ordinary practice, but as Mr. Gunder has named an aberrant form of *M. hofmanni* Behr figured in *The Butterfly Book*, Pl. XVII, fig. 14, in honor of my wife calling it ab. *hollandæ*, I return the compliment by calling this butterfly ab. *gunderiæ*.

Family HESPERIIDÆ.

SUBFAMILY HESPERIINÆ.

Genus THANAOS Boisduval.

Thanaos avinoffi sp. nov.

♂. The wings on the upper side almost uniformly dark brownish black; the fringes a trifle lighter. The fringes are followed inwardly by

a thin sharply defined black marginal line. On the fore wing the outer marginal line is succeeded inwardly by a series of intraneural markings, slightly paler than the ground-color of the wings, defined inwardly by minute deep black sagittate markings, which in turn are followed inwardly by a somewhat paler and very narrow submarginal band, which runs from the costa to the inner margin. There are three very minute translucent preapical spots on the costa, and in some specimens a minute spot above the second median nervule at its origin; the remainder of the wing basad deep black. The hind wings above are deep brownish black, without any distinct markings, except the fine black marginal line. On the under side both wings are a trifle paler than on the upper side, palest at the lower angle of the primaries; the translucent spots appearing on the upper side more distinct on this side. Close scrutiny reveals a very faint and obscure post-median band of lighter spots on the lower side of the hind wings, but these are not always present.

♀. Somewhat lighter in color on both sides of the wings than in the case of the males, and with the lighter markings more distinct. Some of the females have a minute translucent spot at the end of the cell of the fore wing, and most specimens have two such spots, one above, the other below the second median nervule at the point where it is emitted. Expanse: ♂, 1.10-1.15 in.; ♀, 1.15 in.

The above description is based upon a series of over forty specimens collected at various points in the Yukon Valley, the valley of the Kuskokwim, and various other points in Alaska. It is the species of the genus which is most prevalent in Alaska, and which I designated as *T. persius* in the *Entomological News*, Vol. XI, 1900, p. 420. At that time I had only a single specimen before me taken at Fort Selkirk by the late Dr. S. Hall Young. I name the species in honor of Dr. A. Avinoff, whose grandfather, Admiral Avinoff, explored the coast of Alaska for the Russian Government, and whose name is borne by one of its capes.

The type and allotype will be figured in the forthcoming Revised Edition of *The Butterfly Book*, Pl. LI, figs. 28, 29.

SUBFAMILY PAMPHILINÆ

Genus ERYNNIS Schrank (*Pamphila* auct. nonnull.)

It having been definitely ascertained (See Ent. News. Vol. XL, No. 10, 1929, p. 326) that *P. ruricola* Boisd., which is identical with *P. californica* Mabille, is a synonym of *P. vestris* Boisd., it follows that the insect, which has been generally accepted by American authors as *P. ruricola*, is without a name.

In the W. H. Edwards Collection there is a solitary male labelled

"*P. ruricola* ♂, Cala," which agrees with the figures of *ruricola* given by Comstock in the *Butterflies of California* and by Wright in his *Butterflies of the West Coast*. In the collection of Dr. A. W. Lindsey, now owned by the Carnegie Museum, there is a series of specimens, male and female, which are unmistakably the same as the insect in the Edwards Collection and that figured by both Wright and Comstock. I have selected from Lindsey's Collection three males from Ukiah, California, and three males and two females which are labelled from "Nellie, California," and the single specimen in the Edwards Collection as typical of the species, which has hitherto gone under the name *ruricola* Boisd., and give them the specific name *lindseyi* in honor of Professor Lindsey, who in recent years has contributed much to an exact knowledge of the genera and species of the American *Hesperioides*.

***Erynnis lindseyi* sp. nov.**

♂. *Upper side*. Costa and disk of fore wing bright fulvous; outer margin widely and inner margin very narrowly fuscous; at apex two minute coalescing light spots near the costa, followed a little below and nearer the outer margin by a similar light fulvous spot; sexual brand deep black, linear, acute outwardly, and widening a little inwardly toward the base, which it does not reach by the length of a millimeter. Hind wing broadly of the same color as the fore wing, margined more or less narrowly outwardly and more broadly on the costa with black; the inner margin fuscous; fringes whitish. *Under side*. Palpi and end of abdomen white. Fore wing pale fulvous, passing into pale yellowish or whitish toward the lower margin and the outer angle; the apical and submarginal spots of the upper side reappear on this side and are slightly more distinct; the location of the sexual brand on the upper side is indicated on this side by a narrow black line, and there are some black scales near the inner margin at the base of the wing. The hind wing on its outer half is pale grayish fulvous, on the inner half, and especially at the anal angle it is brighter pale fulvous; the light spots on this side of this wing are obscure fulvous yellow, not white or silvery, as in many nearly allied species. These spots are as follows: three small spots arranged as a crescent a little beyond the base of the wing; two small subcircular spots below the costa, the outermost not far from the upper angle, the inner one about the middle of the wing; three minute spots arranged in a transverse discal series beyond the end of the cell.

♀. The female is larger than the male. On the upper side the wings are less fulvous than in the males, and incline to fuscous. Beyond a dark fuscous band, which occupies the same relative position as the sexual brand in the male, but which widens outwardly, are two relatively large light semitranslucent spots. The pale spots near the outer margin of the under side show themselves faintly on the upper

side. On the under the markings of the wings are much the same as those in the male sex. Expanse: ♂, 27-30 mm.; ♀, 32-34 mm.

Holotype, ♂, in Coll. W. H. Edwards, collected by O. Baron; allotype, ♀, in Collection of A. W. Lindsey from Nellie, California; paratypes 3 ♂♂ from Ukiah, Calif., three ♂♂ and 1 ♀ from Nellie, California.

Genus *POANES* Scudder.

Poanes hobomok (Harris) var. ♀ *alfaratta*, nov.

P. hobomok is polymorphic in the female sex. A female in my possession differs so markedly from normal females, and the varieties named *pocohontas* and *quadaguina* by Scudder that I am constrained to apply to it a name to distinguish it.

♀. On the upper side both wings are fuscous, dark at their bases and lighter outwardly. On the fore wings the light spots, which appear in the variety *pocohontas* are greatly enlarged, extending basad as light yellow longitudinal streaks, which tend to fuse with each other about their middle, thus forming an irregular yellow band covering the middle third of the wing. The hind wing is marked by a broad yellow spot in form not unlike that found in the male sex and normal females, but smaller and less orange in tint, inclining to whitish. On the under side the markings of the upper side reappear, but are much paler. Type ♀ in Coll. Holland, *Habitat* Kansas. In size it does not differ from normal females of the species.

This form will be figured in the Revised Edition of *The Butterfly Book*, Pl. LIII, fig. 45.

SUBFAMILY MEGATHYMINÆ.

Megathymus albocincta sp. nov.

♂. Upper side of fore wing fuscous; of hind wing deep black; two light sagittate spots pointing inwardly on the costa of the front wing, the one above the end of the cell smaller, the other, which is larger, midway between the supracellular spot and the apex; the latter spot is the uppermost of an irregular submarginal band of five light spots, the second of which counting from above is semioval the lower three being inwardly elongated; the upper spot of these three, the longest, pointing inwardly toward the cell. The hind wings are broadly banded with whitish on the outer margin. On the underside the wings are much as on the upper side, but paler. The spots of the upper side reappear on this side. The light border of the hind wings is continued around the entire wing being as wide upon the costa as on the outer margin. There are a few indistinct traces of dark dots one near the end of the cell, two beyond it.

♀. Marked exactly like the male above with the light spots a

trifle larger. On the under side agreeing with the male; a minute whitish spot near the end of the cell of the hind wing.

Type and allotype in Coll. Holland (*Ex antiqua coll. W. H. E.*). This very distinct form, or species, has long been in my possession labelled by W. H. Edwards (*cofaqui?*). It has nothing whatever to do with *cofaqui*, and comes nearer to *M. yuccæ* Bdl. & Lec., from which it is, however, totally distinct. It will be figured in the new edition of *The Butterfly Book*.

XI. TWO NEW SUBSPECIES OF *MELITÆA HARRISI*, WITH REMARKS UPON RELATED FORMS.

BY A. AVINOFF.

(PLATE VI).

Early in July, 1927, three specimens of *Melitæa* closely related to *M. harrisi* Scud., were obtained by me in Cook Forest. The next year about the same season two more females of this butterfly were captured. I delayed describing this form until I might obtain a male specimen in order to make a full comparison with *M. harrisi*. Through the kindness of Mr. S. Weadner, I have been fortunate in being able to examine two males undoubtedly belonging to the same form. They were captured at Slippery Rock, Pa., at the end of June, 1928, together with several females identical with the specimens from Cook Forest. Mr. Weadner has kindly donated one of these males to the Carnegie Museum.

1. *Melitæa harrisi liggetti*, subsp. nov. (Pl. VI, ff. 4-7)

The butterfly has a larger expanse of wing than the usual run of *M. harrisi* Scudder from New England and New York. The fore wing of the male measured on the costa has a length of 20 mm., somewhat exceeding the average length of *M. harrisi*, ♂, indicated by Scudder. The fore wing of the female, measured in the same way, exceeds that of the largest specimens of *M. harrisi*, the maximum size of which is given by Scudder as 21.5 mm. The length of the fore wing of the females of the subspecies which I am describing is 24 mm.

Upper side: The main characteristic of this new subspecies is the strong development of the dark areas on both wings, which may be described as being very dark fuscous (almost black), with a relatively narrow fulvous median band on both wings, succeeded outwardly on the fore wing by a series of fulvous intraneural round spots and on the hind wing by a band of lunular markings. These series of markings are separated by a distinctly dark fuscous area, which in typical *harrisi* is only faintly indicated, the fulvous ground-color predominating over the whole median area of the front wings, and being broadly extended over the larger part of the surface of the hind wings. The basal half of the wings in the new subspecies has the usual maculations of *harrisi*, but somewhat obscured and reduced in size. The male and female match each other in their characters, except that the fulvous

markings of the male are uniform in tinge tending toward orange-brick, while in the female the median band of markings of the hind wing is a trifle lighter inclining to yellowish. Owing to this lighter coloration of the median band and its narrow expanse on the hind wings of the female, this sex shows a superficial resemblance to the hind wings of the aberrant female of *M. palla* Behr, to which Wright has given the name *eremita*, from which, however, the present form is widely differentiated in other respects.

Under side: On this side *M. harrisi liggetti* agrees well with *harrisi*, except that the basal half of the fore wings is more heavily marked than is the case in *harrisi*, in the majority of specimens of which this part of the wing is frequently devoid of all dark markings, being uniformly fulvous. However, this is not a stable characteristic, as some specimens of *M. harrisi* show almost as well developed transverse marking in this part of the wing as in the specimens of the new form. The antemarginal band in the male is dark, being suffused with dark scales, which are not so pronounced in typical *M. harrisi*. Expanse: ♂, 40 mm.; ♀, 42-45 mm.

I take pleasure in dedicating this new subspecies of *M. harrisi* to Mr. Thomas Liggett, the indefatigable advocate of preserving the Cook Forest as a public park, in which endeavor he finally succeeded by rallying wide public support to the undertaking. *M. harrisi liggetti*, the recently discovered inhabitant of the splendid primeval forest, which Mr. Liggett has helped to rescue from the axeman, preserving it for all time as a recreation ground for the people of Pennsylvania, by its name will perpetuate the memory of his self-sacrificing exertions.

The new subspecies is the southernmost representative of typical *harrisi*, which has its habitat in the northeastern states and the southern part of Canada ranging approximately between 42° and 50° of north latitude. It represents a southwestern extension of the range of the species in western Pennsylvania. Scudder in his classical work on "The Butterflies of New England," mentions that Mr. Charles Dury obtained a specimen of *M. harrisi* in the neighborhood of Cincinnati, Ohio. However, Dr. Scudder expressed doubt as to the correctness of the identification of the butterfly listed by Mr. Dury. In order to clear up the matter I corresponded with Mr. Dury, who most obligingly made every effort to verify the record, but was unable to locate the specimen in question. It is probable, however, that the new race will be found in other localities in western Pennsylvania, and possibly in southern Ohio.

The male of *M. harrisi*, figured in the book of John H. and A. B.

Comstock entitled "How to Know the Butterflies," Pl. 22, fig. 5, is somewhat darker than typical representatives of the species. However, the development of the brown-black pattern does not reach the intensity and extent observed in the subspecies *liggetti*; that is to say, the median dark band dividing the two rows of fulvous markings on the hind wings is very faintly indicated so that the fulvous ground-color of the two bands flows together to a considerable extent. A specimen of *M. harrisi* displaying the under side in fig. 8 of the same plate is less heavily marked with brown-black than in the new race. The provenance of the specimen figured by Comstock is not indicated, but it may be inferred that it came from some place in New England in view of the remark made in the text: "It is a New England species, seldom being found south of the 42d degree of latitude." The specimen of the male of *M. harrisi* figured in The Butterfly Book of Dr. W. J. Holland, Pl. XVII, fig. 5, is a fair example of typical *harrisi*, corresponding closely with the average run of specimens of that species, exhibiting a greater expansion of the fulvous coloration of both wings than the specimens figured by Comstock. The butterfly photographed in colors in Dr. Holland's book has moreover a decidedly more accentuated development of the antemarginal row of markings in both wings. The under side of *harrisi* shown by Holland on the same plate, fig. 6, is not as heavily marked with brown-black as is the subspecies *liggetti*.

2. *M. harrisi albimontana* subsp. nov. (Pl. VI, ff. 8, 9)

Specimens of *M. harrisi* from New Hampshire and Canada reveal an opposite tendency to what is observed in the material obtained in western Pennsylvania. A series of examples from Peterboro, N. H., in the Carnegie Museum and a specimen from the White Mountains in the Holland Collection (the latter selected as the type) are all uniform in showing a reduction in the intensity and development of the dark bandings. The fulvous ground-color predominates on the surface of both wings. The marginal bands are narrow. The restriction of the dark pattern is especially marked on the hind wings, which only show traces of the fuscous pattern usually heavily accentuated in typical *M. harrisi*. The question of the stability of this form over a wide area awaits the acquisition of more material, but the individuals, which we have studied, suggest a subspecific designation for this race, which I name *Melitæa harrisi albimontana*.

In the Proceedings of the Royal Society of Canada, Vol. IX, Section 4, 1902, p. 207, James Fletcher described *Phyciodes hanhami*,

which he compares with *P. nycteis* and *Melitæa harrisi*, pointing out as the main characteristic: "The absence on the secondaries of the median black line, which in those two species divides the fuscous discal area on almost all specimens." The description was based on twelve specimens, six males and six females, from Manitoba and Minnesota. The types of both sexes are deposited in the United States National Museum at Washington. Fletcher accompanies his description by colored figures of the upper side of the male and the under side of the female.

Arthur Hall in his "Revision of the Genus *Phyciodes*," published as a supplement to the Bulletin of the Hill Museum, Vol. II, 1928, tentatively regards *hanhami* as a race of *harrisi*, referring the species to the genus *Phyciodes*. He says: "I have not seen this form and am not quite sure whether it belongs here or to *P. nycteis*. Hall is justified in his hesitation to make a generic reference inasmuch as *hanhami* forms a perfectly intermediate link between the *harrisi* group of *Melitæa* and the *nycteis* group of *Phyciodes*, in fact at this point both genera appear to merge into each other showing scarcely any sufficient generic distinction to separate them. The neurulation of these two groups reveals substantial similarity and the formation of the palpi does not provide a valid basis for keeping the two genera apart.

A comparison of three specimens of *hanhami*, most obligingly loaned to me by Dr. J. D. McDunnough from the Canadian National Collection at Ottawa, shows that superficially they resemble *Melitæa harrisi albimontana*. The resemblance is restricted to the upper side. The under side is different. The species *hanhami* possesses a complete row of silvery white antemarginal lunules, like the one found in the genus *Phyciodes*. These lunules in *Melitæa harrisi albimontana* are not silvery but dull yellowish, less conspicuous than in typical *M. harrisi*. The dark markings of the under side of the hind wing in *hanhami* are extremely attenuated. The dark band between the outer lunular row and the median light band being scarcely indicated, except at the costal border of the wing. *M. harrisi albimontana* is doubtless an extremely light form of *M. harrisi*, which does not show any special difference on the under side of the wings, and is practically identical with the typical form, save that the central part of the front wings and the basal part of the hind wings is lighter than in typical *M. harrisi*.

In conclusion it may be observed that the American butterflies

of the genus *Melitæa* have not been as thoroughly studied as those of Europe and it is possible that there may exist other subspecies worthy of being characterized. In the Old World recent monographers have set up many minute differentiations in recognized species. This is especially true in the case of *M. didyma*. However, many of the characters assigned to these subspecies by European writers are so indefinite and elusive that the correct identification of the new forms is exceedingly difficult.

EXPLANATION OF PLATE VI.

- Fig. 1. *Melitæa harrisi* Scudder, ♂ (typical).
Fig. 2. *M. harrisi* Scudder, ♀ (typical).
Fig. 3. *M. harrisi* Scudder, ♂, under side (typical).
Fig. 4. *M. harrisi* var. *liggetti* Avinoff, ♂ (type).
Fig. 5. *M. harrisi* var. *liggetti* Avinoff, ♀ (allotype).
Fig. 6. *M. harrisi* var. *liggetti* Avinoff, ♂, under side.
Fig. 7. *M. harrisi* var. *liggetti* Avinoff, ♀, under side.
Fig. 8. *M. harrisi* var. *albimontana* Avinoff, ♂ (type), from White Mountains.
Fig. 9. *M. harrisi* var. *albimontana* Avinoff, ♂, under side, (paratype), from Peterboro, N. H.
Fig. 10. *Phyciodes hanhami* Fletcher, ♂, from Aweme, Manitoba.
Fig. 11. *P. hanhami* Fletcher, ♀, from Aweme, Manitoba.
Fig. 12. *P. hanhami* Fletcher, ♂, under side, from Aweme, Manitoba.
Fig. 13. *Phyciodes tharos* (Drury) ♂. Agrees with Drury's figure.
Fig. 14. *P. tharos* (Drury), ♀, under side.
Fig. 15. *P. tharos* var. *marcia* Edwards, ♂, (typical).
Fig. 16. *P. tharos* var. *marcia* Edwards, ♀, under side, (typical).
Fig. 17. *P. nycteis* (Doubld. & Hew) ♂.
Fig. 18. *P. nycteis* (Doubld. & Hew) ♀, under side.

Specimens represented by figures 1-3 are from Massachusetts.



Melitaea and *Phyciodes*.
(For explanation see opposite page)

XII. A NEW TOAD OF THE GENUS EUPEMPHIX.

BY M. GRAHAM NETTING.

(PLATE VII)

While examining the specimens of *Eupemphix pustulosus* (Cope) in the collection of the Museum of Zoology of the University of Michigan I noticed that two very distinct forms were included under this name. I have been unable to locate the type of *Paludicola pustulosa* Cope, but the published description apparently refers to the form which is most common in Panama.

I am indebted to Dr. A. G. Ruthven for permission to describe this form and to Miss Grace Eager for preparing the drawings.

***Eupemphix ruthveni*, sp. nov. (Pl. VII, fig. 1).**

Type. No. 45582, Museum of Zoölogy, University of Michigan; adult male; from Fundación, Colombia; collected Aug. 16, 1913, by Alexander G. Ruthven, at a forest pool.

Diagnosis. A large *Eupemphix* which differs from *E. pustulosus* in having a more granular belly, which is immaculate posteriorly, or marked with small, light brown spots, instead of with large, black, coalescing spots; in lacking large spots on the ventral surfaces of the femora; and in its less contrasting coloration. It differs from *E. trinitatis*, which it resembles ventrally, in having smaller warts, which are circular rather than linear, and in having a different coloration.

Description. Head small; snout protruding; nares nearly terminal; canthus rostralis rounded; eyes large, upper lids equalling the inter-orbital width; tympanum scarcely visible. A large, triangular parotoid behind the tympanum, and a small inguinal gland halfway between the axilla and the hind leg. Fingers slender, with slightly swollen tips, first as long as second; toes moderate, with rudiments of a web; faint tarsal fold present; subarticular tubercles prominent; two oval metatarsal tubercles; a small, conical tubercle on the middle of the inner edge of the tarsus. The tibio-tarsal articulation reaches the eye, and the tarso-metatarsal articulation a little beyond the tip of the snout. Upper surfaces covered with small, round warts which

become larger toward the sides; belly and ventral surfaces of the thighs granulate. A large, external vocal sac, and two brown pads on the inner side of the inner finger.

From snout to vent 30.2 mm.; femur 13.2 mm.; tibio-fibula 14.3 mm.; whole foot 20.5 mm.; length of head 9 mm.; width of head 9.3 mm.

Color (in alcohol): Gray above with a faint, light gray pectoral spot and a whitish vertebral stripe extending a short distance forward from the ischial symphysis; below, anterior half of vocal pouch black, posterior half light brown; creamy color of breast largely obscured by light brown mottlings; belly cream-colored, with a few small brown spots anteriorly, immaculate posteriorly; forelegs with dark cross-bars, but without a conspicuous light band across the elbows; hind legs with dark bars above, beneath speckled with light brown anteriorly, immaculate cream-colored posteriorly.

Notes on Paratypes. I have designated as paratypes fourteen specimens in the collection of the Museum of Zoölogy at Ann Arbor. These bear the following numbers: 45484-45488, 45579, 45580, 45583, 48196, 48200, 48201, 54586-54588. They were collected at the following localities in Colombia: between Mamatoco and La Tigrera; Minca; Santa Marta; Fundación; Don Diego; near Bolivar; and near Valencia. There are seven males in this series, which have an average length from snout to vent of 27.9 mm.; six females, which average 31.7 mm. in length; and one immature specimen. The paratypes show considerable variation in the distinctness of the pectoral spot, in dorsal coloration, and in the length of the vertebral stripe. In other respects they agree with the type.

Remarks. *E. ruthveni* is most closely related to *E. trinitatis*, although an X-ray of a single specimen of each species indicates differences in the structure of the skull which will merit further study. I believe that *E. pustulosus* is more closely related to *E. stentor* than it is to *E. ruthveni*. Both *E. pustulosus* and *E. ruthveni* occur at Fundación, Colombia, and the ranges of the two species may be found to overlap throughout large areas in northern South America.

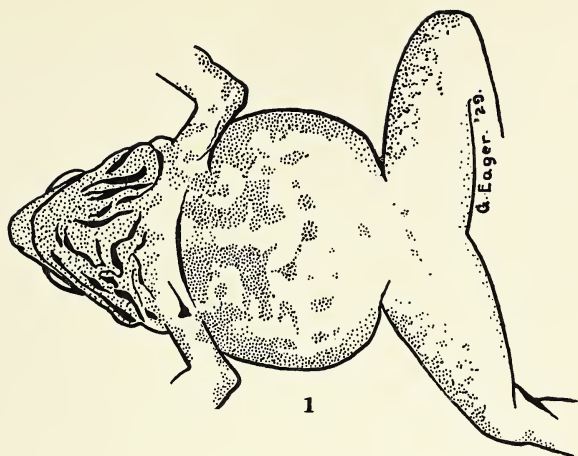


FIG. 1. *Eupemphix ruthveni* sp. nov.

Ventral surface of type, No. 45582, Mus. Zoöl., Ann Arbor (From Colombia).

FIG. 2. *Eupemphix pustulosus* (Cope).

Ventral surface of No. 63574, Mus. Zoöl., Ann Arbor (From Panama).

XIII. THE OCCURRENCE OF LIZARDS IN PENNSYLVANIA.

BY M. GRAHAM NETTING.

The Carnegie Museum has recently received so many inquiries concerning the presence of lizards in Pennsylvania that it has seemed worthwhile to list the species, which have been recorded from the state, and to consider in some detail the occurrence of each form. It is hoped that this paper will encourage naturalists to attempt to locate the various lizards in additional localities in order to ascertain more definitely the range of each species within the state.

In the preparation of this paper I am indebted to Dr. F. N. Blanchard for helpful criticism and advice.

The collection of Pennsylvanian specimens in the Carnegie Museum is fairly large and includes specimens of many species, which are apparently rare in the state. This material has been mainly gathered by Dr. D. A. Atkinson, Honorary Curator of Herpetology. His indefatigable collecting more than twenty-five years ago, before the Pittsburgh district became so populous, and before the streams were polluted, supplied the Museum with material which could not be duplicated today. More recently, in spite of the pressure of professional duties, he has collected many valuable specimens. The remainder of the collection has been gathered, to a great extent, by Messrs. G. A. Link, Sr., S. N. Rhoads, and, during recent years, by the writer.

The basis for any work on the distribution of Pennsylvanian reptiles is the series of reports by Surface. However, these papers are not readily available, as they are now out of print. Moreover, since their publication more thorough collections have been made in the western part of the state, and more specimens of the rarer species have been secured. In addition to Surface's papers, a number of local or county lists have been published from time to time, and many records are scattered through the literature.

Five species of lizards have been recorded from Pennsylvania. Of this number only the following three are represented by specimens:—

Fence Lizard, *Sceloporus undulatus*

Black Skink, *Eumeces anthracinus*

Common Skink, *Eumeces fasciatus*

The remaining species, as listed below, have been recorded from Pennsylvania. The occurrence of these species is extremely doubtful, and is considered in detail on succeeding pages.

Six-lined Lizard, *Cnemidophorus sexlineatus*

Ground Lizard, *Leiolopisma laterale*

1. Fence Swift, *Sceloporus undulatus* (Latreille)

This species can be distinguished from the other lizards listed in this paper by its keeled dorsal scales. It is the most common lizard in the state. I know either of specimens from, or published records for, the following counties:—

Allegheny	Delaware
Beaver	Franklin
Berks	Fulton
Bucks	Juniata
Chester	Lancaster
Clearfield	Mifflin
Clinton	Perry
Cumberland	Pike
Dauphin	Snyder

York

There is a specimen in the Museum of Comparative Zoölogy at Cambridge, Mass., labeled "Lookout Mt., Penna." If this specimen is from Lookout, Wayne County, as seems probable, it is the northernmost record for the state. This lizard is to be expected in all of the southern and in most of the mountainous counties of the state. It is found sunning itself on boulders, running along rail fences, and playing around old shanties and lumber-piles.

2. Black Skink, *Eumeces anthracinus* (Baird).

This rare skink is generally distinguished from *E. fasciatus* by the presence of only four longitudinal light lines. There is never a distinct vertebral stripe present, and each lateral pair of light lines encloses a wide stripe of anthracite black. According to Burt (1928) the above distinctions do not always serve to separate these two species, for the young of *anthracinus* may be almost uniform blackish,

and the vertebral stripe of *fasciatus* tends to disappear with age in both sexes. He uses the coloring of individual dorsal scales to distinguish puzzling specimens. Thus in *anthracinus* the scales of the mid-dorsal region are unicolor, while in *fasciatus* these scales have perceptible light and dark areas, the center being ordinarily light. In old males of *fasciatus* the lines may disappear entirely, and the cheeks become reddish and bulging. From what is known of old males of other species of the genus it would be logical to expect the same development to occur in *anthracinus*, but Burt (1928, p. 49) says "cheeks never bulging." In a recent interview he stated that the examination of additional material had proved that old males of *anthracinus* also develop bulging cheeks, but that all such specimens examined could be separated from the old males of *fasciatus* by the unicolor dorsal scales.

Both *E. anthracinus* and *E. fasciatus* can be distinguished from *Leiolopisma laterale* by their greater size, better developed limbs, and scaly lower eyelids.

The type specimens of *anthracinus* were taken on the North Mountain near Carlisle, Cumberland Co., Pennsylvania. There is one specimen (No. 6) in the Carnegie Museum, which was secured at Karthaus, Clearfield County, July 13, 1908, by Atkinson and Link. No. 38197 in the National Museum collection is labeled "Pa. Mts. near Ronova, 1907, J. B. Smyth." This locality is probably intended for Renova, Clinton County. These three records apparently are the only ones for the state.

Roddy (1928, p. 46) says, "Five species [which would include *E. anthracinus*] occur in Lancaster County and the same number in the state." However, on page 50, he contradicts himself, as follows:—"It is a rare skink in Lancaster County, but of wide distribution, extending from northern New Jersey to Texas. . . . To my knowledge it has never been reported as occurring in the county [Lancaster], but, without doubt, will be found in the mountainous sections of Lancaster-Lebanon or Lancaster-Berks borders."

3. Common Skink, *Eumeces fasciatus* (Linné).

This lizard, frequently referred to as the Blue-tailed or Red-headed Skink, has been distinguished from *E. anthracinus* above. Young specimens and the majority of females show five longitudinal light lines. Since this form cannot be distinguished from *anthracinus* in

the field I am forced to omit quite a number of sight records of "blue-tailed skinks" which should probably be referred to this species. It has, however, been recorded from the following counties:

Allegheny	Huntingdon
Center	Lancaster
Clarion	Montour
Clinton	Westmoreland
Cumberland	York
Dauphin	

This distribution seems to indicate a greater abundance in the mountainous counties of the state. Careful collecting in such regions proves that this lizard is commoner than is generally supposed. Ian Sharpe and William Hamnett took four specimens in a sawdust-pile near Waterford, Westmoreland County, during the summers of 1927 and 1928. I examined these specimens, and also five eggs and one embryo, the remains of a nine-egg clutch, which was found in the same sawdust-pile about the middle of July 1928. The embryo measured 34 mm. in length.

4. **Six-lined Lizard**, *Cnemidophorus sexlineatus* (Linné).

This lizard may be most easily distinguished from the four other species mentioned in this paper by the differences in the tail, the scales of which are keeled and abruptly different from those on the body. It also differs in having granular scales on the back; large, oblong plates on the belly arranged in eight regular rows; and large plates on the arms and legs.

Surface (1908, p. 253) lists this species as of possible occurrence in Pennsylvania. Roddy (1928, p. 51) says, "It occurs in Lancaster County mainly in the lower Susquehanna Valley." I am well aware that this form has been taken in Maryland, and that if it should range into Pennsylvania, the lower Susquehanna Valley would be the logical place to expect it. However, in the absence of specimens, it cannot be definitely listed from the state.

5. **Ground Lizard**, *Leiolopisma laterale* (Say).

This lizard differs from the others considered here in having minute limbs, and in its small size. It differs from the species of *Eumeces* in

having lower eyelids with a transparent central part, and an elongate, cylindrical body.

Regarding the occurrence of this species in Pennsylvania, Surface (1908, p. 251) says, "We have not been fortunate enough to collect specimens of this species in Pennsylvania, but we have seen a specimen No. 3550, in Cornell museum, which was collected on the Caroline Hills near Ithaca, N. Y., April 13, 1892, by Messrs. W. J. Terry and Louis A. Fuertes. While it is abundant in the Southern States it is evidently rare in Pennsylvania, although it is to be found in this state." Reed and Wright (1909, p. 408) later published the record for this same specimen, referring to it as *Leiolopisma laterale*. Bishop (1918, p. 36) has the following to say in regard to this specimen: "A third species was recorded by Reed and Wright from Cayuga Lake Basin as *Lygosoma* (*Leiolopisma*) *laterale* (Say). While examining this specimen a few years ago, Dr. Wright called my attention to the fact that the supposed *Leiolopisma laterale* had proven to be *Plestiodon anthracinus* Baird." Roddy (1928, p. 50) was apparently unaware of Bishop's published statement for he says, "This lizard, sometimes known as the Brown-backed Skink or lizard, belonging mainly to the Carolinian fauna, has, however, been taken as far north as Ithaca, New York. I have observed it only once in the County [Lancaster] near Holtwood."

While it is possible that this species, which has been reported from both Maryland and New Jersey, may enter southern Pennsylvania, I hesitate to include it on the basis of a "sight record." It has been confused in the laboratory with *Eumeces anthracinus*, and Ditmars (1907, pp. 203-204) speaking of its identification in the field says: "Many times has the writer mistaken these reptiles for small salamanders—*Spelerpes* or *Plethodon*." Therefore, until a Pennsylvanian specimen is collected, this skink should not be listed in the fauna of the state.

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XIV. THE POISONOUS SNAKES OF PENNSYLVANIA AND THE TREATMENT OF SNAKE-BITES.

BY M. GRAHAM NETTING

(PLATES VIII-IX)

INTRODUCTION

Each summer finds an increasing number of campers enjoying the mountains and forests of Pennsylvania. This fact, coupled with the fact that there is no apparent decrease from year to year in our poisonous snakes, leads us to conclude that each season more persons are exposed to possible snake-bites with frequent fatal consequences. This paper has been prepared to enable campers to recognize our venomous snakes, and, thus, to avoid them. Since the treatment of snake-bites has undergone great modification, due to the introduction of Antivenin in recent years, references to this newest method of treatment have been included.

The three poisonous species mentioned in this paper are the only venomous reptiles which occur in Pennsylvania. The "Water Moccasin," to which our farmers constantly refer, is a harmless, albeit a bad-tempered, water-snake. The true Water Moccasin, or Cottonmouth, is a poisonous snake of the Southern States, which ranges from West Virginia to the Gulf. Furthermore, that consummate "bluffer," the Puff Adder, or Spreading Viper, is quite innocuous, although it does imitate poisonous snakes at times. I think that it would be well for the public to forget the misleading names, which have been applied to this harmless snake by persons who considered it poisonous, and to refer to it by its more prosaic, and more accurate name, the "Hognosed Snake."

Finally, I should like to invite campers to make use of the facilities of the Carnegie Museum at all times. This institution is anxious to serve nature-lovers whenever possible. Specimens of reptiles sent to the Museum will be identified and then either returned or added to our collections, as the sender desires.

ACKNOWLEDGEMENTS

I am deeply indebted to Mr. R. H. Hutchison, Secretary of the Antivenin Institute of America, a division of the Mulford Biological Laboratories, for his kindness in giving me valuable information as to the preparation and administration of Antivenin. The three photographs credited to the New York Zoölogical Society were secured through the kindness of Mr. Elwin R. Sanborn. My thanks are also due to Dr. W. J. Holland for seeing this paper through the press.

HOW TO RECOGNIZE A POISONOUS SNAKE

All of the venomous serpents of Pennsylvania belong to the group of pit-vipers, and are so named because they have a deep pit (see Pl. VIII, fig. 1) on each side of the head between the eye and the nostril. None of our harmless species has such a pit. All three species have eyes with elliptical pupils, similar to those of a cat; short, stout bodies; stumpy tails; and long fangs, which fold back against the roof of the mouth. All three have more or less triangular heads, but this character will not distinguish them from our harmless snakes, as some of these also have triangular heads. The only safe way to identify a poisonous snake in the field is to know the three species well enough to recognize them at a short distance. This is not so hard as it might at first appear, for two of the species can be recognized as soon as the rattles are seen, and the Copperhead, which has no rattle, is a strikingly marked snake.

GENERAL INFORMATION ABOUT POISONOUS SNAKES

Poisonous snakes are usually anxious to avoid human beings, and generally assume a defensive position only when startled, or too closely cornered to escape. I have yet to see one of them act in as truly terrifying a manner as the harmless Hog-nosed Snake, when it is trying to bluff an enemy. Of course, the temper of individual snakes varies greatly under different conditions, probably as much as that of human beings. The southern Cotton-mouth Moccasin is considered vicious-tempered by some writers, yet I have deliberately poked one of these snakes with a stick without making it noticeably angry.

The venom is injected into the victim by hollow teeth, or fangs, which are located in the upper jaw. Among the pit-vipers the fangs are erected as the snake strikes. Removing the fangs does not render

the snake harmless, for new fangs from the reserve supply soon replace those which have been removed. The tongue, or "stinger," plays no part in the injection of venom.

The venom is a viscid fluid of yellowish color, and is composed largely of proteins. It is produced by glands which are similar to the salivary glands in mammals. Dried venom retains its poisonous properties for many years. The venoms of the different species differ in their poisonous qualities and the quantity injected varies according to the size and age of the snake, and according to other conditions, such as the length of the period of fasting.

A venomous snake strikes most effectively when coiled. Careful observers of snakes distinguish between the "resting coil" and the "striking coil." A snake can strike without coiling, sometimes for about three-fourths of its length. From a striking coil a snake can strike for about one-half of its length, and in almost any direction, except backwards. The danger zone about a poisonous snake is a circle with a radius as great as the length of the snake. A snake does not leap at its prey or at its enemies. I believe that coiled rattlers generally rattle before striking, but the popular conception that the rattlesnake "is a gentleman, and always rattles before striking" is quite erroneous. When a snake is shedding its skin and its vision is temporarily obscured it may be expected to strike viciously at anything that comes too near. Furthermore, if a snake is stepped on or touched it strikes in the quickest possible fashion without warning and without attempting to escape. With the above exceptions, it must be admitted that the small number of cases of snake-bite in this region are due more to the retiring dispositions of our venomous snakes than to the watchfulness of those hundreds of campers, who all unknowing pass close to quiet yet deadly snakes.

A KEY TO THE POISONOUS SNAKES OF PENNSYLVANIA

1. No pit between eye and nostril..... Harmless snakes
 A pit between eye and nostril..... Poisonous Snakes, (see 2)
2. A rattle present.....(see 3)
 No rattle present..... Copperhead
3. Top of the head covered with small scales. . . . Banded Rattlesnake
 Top of the head covered with large plates..... Massasauga

THE COPPERHEAD, (Pl. VIII, fig. 2)

Agkistrodon mokasen (Beauvois).

This snake is variously called Highland Moccasin, Chunkhead, Kupferschlange, and Rattlesnake-pilot. It is the most widely distributed poisonous snake in Pennsylvania. I have records of its occurrence in more than half of the counties of the state, and I feel quite sure that it occurs in every county. Within the last ten years Copperheads have been killed within the city-limits of Pittsburgh. It is smaller (rarely exceeding forty inches in length) than the Timber Rattlesnake and its fangs are shorter, but its extreme abundance in populated sections renders it more dangerous. The saddle-shaped blotches of brown or red which extend down the back are a good field-mark for this species. This coloration makes the Copperhead easy to see when in the open, but very hard to distinguish when it is among fallen leaves. It feeds by night upon insects, small mammals, birds, and frogs, and hides by day under stones and logs in the woods and rocky pastures. The Copperhead frequents damp places, and is occasionally found swimming in streams. This snake gives birth to from four to ten young from the latter part of August to the first part of September. Young Copperheads have sulphur-yellow tails, which resemble maggots, and which may serve to attract their prey, and they are venomous at an early age. The Copperhead is sometimes confused with the harmless Milk- or House-snake, but it can be instantly distinguished from this smooth-scaled serpent by its keeled scales. From its feeding habits we must concede that this snake is economically beneficial.

THE MASSASAUGA, (Pl. IX, fig. 1).

Sistrurus catenatus catenatus (Rafinesque).

This snake is known to farmers in those isolated spots where it occurs as the Black-snapper, Swamp-rattler, or Pygmy Rattler. It is a rare snake in Pennsylvania and has been reported from only four counties; *i.e.*, Crawford, Mercer, Butler, and Allegheny. At one time it may have been commoner, but its range in this state was not much greater than at present. It certainly never occurred east of the Alleghenies in Pennsylvania. At present the Massasauga is found only in a few swamps in the above counties, and in the fields near

those swamps. This species may be recognized by the chain of dark blotches which extends down its back and by its small rattle. Some specimens are almost black. This snake reaches a length of more than three feet. It feeds primarily upon rodents, small birds, and frogs. Late in July or during August the females produce from five to nine young. The bite of this snake is rarely fatal, but it should receive the same careful treatment that would be administered in other cases of snake-bite.

THE BANDED RATTLESNAKE, (Pl. IX, fig. 2).

Crotalus horridus Linnæus.

This species is locally called the Timber- or Mountain-rattler. Males, and sometimes females, are frequently black in color, and females are often yellow. These color-phases have given rise to the names Black Rattlesnake and Yellow Rattlesnake. This snake is the only large rattler, which occurs in the eastern region, and is easily distinguished from the Massasauga by its size, and by the wide, dark brown, or black bands which cross its body. Some specimens reach six feet in length, but average specimens in Pennsylvania are less than four feet long. The Banded Rattlesnake is now extinct in the thickly-populated counties of the state, but it occurs in most of the mountainous sections, and I believe that it is increasing in numbers in such regions. It is not to be expected in flat, cleared regions of low altitude, nor in the moist situations which the Copperhead frequents. Large numbers hibernate together in "dens," and remain together during the mating-season in spring. During the summer they spread into the timber and along the ridges. On sunny afternoons in late summer I expect to find them along the rocky ledges among the huckleberry-bushes. This snake is not so common nor so wide-spread as the Copperhead, but its size is greater, its fangs are longer, and it appears earlier in the day. Unlike the preceding species it rarely, if ever, feeds upon frogs, salamanders, or insects. Its diet consists of mammals, mainly rodents, and, rarely, of birds. It is the most economically beneficial of our local venomous snakes, and I should dislike to advise its complete extermination. From seven to twelve young, about a foot long, are produced during September. Originally only provided with a button, they add about three segments to their rattles each year after the first. If the rattle becomes too long part of it breaks off, so

that little can be told as to the age of some of these snakes by the number of the segments.

SNAKE-BITE IN THE UNITED STATES

Statistics as to the number of cases of snake-bite annually are notoriously incomplete. Dr. Amaral says¹ that there are probably "over 1,000 cases of bites of poisonous snakes in this country every year, with a death-rate that runs from 10 per cent. in the Middle West to 25 per cent. in the South and 35 per cent. in the Southwest."

Although the mortality in some regions is low, all cases of snake-bite are painful, and frequently the ill effects are quite prolonged, if the old remedies are used. Infection of the wound is quite likely to occur, and the victim may be incapacitated for several weeks. Most writers seem to have overlooked the economic loss that is suffered by persons who are temporarily disabled.

The use of Antivenin greatly reduces the mortality. Of one hundred and fifty cases of snake-bite in Texas² during one year Antivenin was used in eighty-three cases and not used in sixty-seven cases. The mortality when Antivenin was used was 6 per cent., and when it was not used 34.3 per cent. All of the five persons who died, although treated with serum, would likely have been saved, if the Antivenin had been injected earlier and in sufficient quantity. The use of Antivenin hastens recovery greatly and reduces the possibility of infection.

PROTECTION AGAINST POISONOUS SNAKES

The following remarks are written to apply primarily to our local snakes and must not be taken as a safe guide for all parts of the country.

The majority of snake-bites are inflicted on the feet or legs. Shoes and leather leggings, or hiking-boots are ample protection, and one or the other is necessary for safety in the mountainous parts of the state. When climbing rocky ledges be careful to keep the face away from the rocks and either wear heavy gloves or climb without using the hands. The Copperhead and Timber Rattlesnake are apt to be found in such places. Never descend during the warm months into the sink-holes or rock-chimneys, which occur along some of our mountain-ridges. Copperheads are quite common in these moist, dark cavities.

¹Harvard Alumni Bulletin, XXIX, No. 21, Feb. 24, 1927, p. 603.

²Amaral, Bulletin Antivenin Inst., I, No. 3, Oct. 1927, p. 80.

In the regions where snakes are plentiful do not put the fingers under a rock or log when turning it over, but use a stick for this purpose. In western Pennsylvania both the Massasauga and the Copperhead will strike as the log or rock is removed. In going through the woods step on top of a log and then down. One girl was bitten by a Copperhead near Pittsburgh because as she stepped over a log her foot came down beside the snake. Barefooted children should not run after dark through the woods or along dirt-roads. Copperheads wander about at this time, and frequently seek the warm dust of the roads. Do not wear "Oxfords" and silk-stockings in the woods.

Do not make pets of poisonous snakes. It is quite true that many dangerous snakes become tame in captivity, but even "tame" rattlesnakes should not be handled by inexperienced persons. After you have killed a poisonous snake be very careful of the head. For some time after the death of the reptile the jaws are capable of closing down and of driving the fangs into the flesh. If you wish to skin the snake, first sever the head from the body, keeping one foot on the head while you do this.

In general, wear your heaviest footgear when camping in the woods, keep your eyes open, and remember that in most instances snakes are just as anxious to avoid you, as you are anxious to avoid them.

A HISTORY OF TREATMENTS

From the earliest times human beings have searched for remedies for snake-bites. Among savage peoples today a variety of herbaceous extracts, frequently characterized by their foul odor, are in use. In our own country many varied treatments have been used. Chickens are split open and applied to the wound, gunpowder is piled on the wound and then touched off, the finger bitten is chopped off, cloths soaked in urine are applied to the wound, or large quantities of alcohol are administered. Some of these treatments are useless, although the victim may survive in spite of the treatment, and some of the above methods are more or less effective, but are cruelly drastic.

Until the development of anti-toxin there was no efficient remedy for snake-bites. Some years ago various agencies throughout the world began to prepare anti-toxins or serums for use in case of injury by the venomous snakes of their respective localities. Many Americans have visited the famous "Snake-farm" of the Government Institute of Serotherapy at Butantan, Brazil, which was established in

1897. Under the brilliant direction of Dr. Vital Brazil this Institute prepared large amounts of serum. Dr. Raymond L. Ditmars was instrumental in securing a small amount of this serum annually for use in the United States. Although this amount was woefully small, it effected the saving of human life on numerous occasions.

In 1926 the H. K. Mulford Company, with the coöperation of the United Fruit Company and Harvard University, established the Antivenin Institute, with laboratories at Glenolden, Pennsylvania, and sub-stations, for the collection of venom, throughout this country and at Tela, Honduras. Dr. Afranio do Amaral, thoroughly trained in the preparation of anti-toxin at the Brazilian "Snake-farm" came to this country to direct the work at the new laboratory. Dr. Amaral, after completing his task in a highly successful manner, has returned to Brazil, but he is retained as Consulting Director of the Antivenin Institute.

Antivenin has been prepared in quantity, duly approved by the United States Public Health Service, and is now available at hospitals and drug-houses throughout the country. It can be used against the bites of all the poisonous snakes in the United States, with the exception of the two species of Coral Snakes which occur rather rarely along our southern borders. A special serum is prepared for use in the case of livestock, but, if necessary, the regular Antivenin may be used. Every large children's camp in regions where poisonous snakes occur should have Antivenin in its medicine chest. If it does not have a supply on hand, I feel that the person in charge should be considered criminally negligent. Campers and tourists should carry a supply.

THE PREPARATION OF ANTIVENIN

At the various sub-stations snakes are "milked" by competent handlers. The venom obtained is mixed with glycerine or dried, then labeled, and shipped to the main laboratory. There it is dissolved, diluted, and injected into horses in increasingly large doses over a period of months. After about eight months the horses develop an antitoxin in their blood which neutralizes the effects of venom. Then, by a very humane method, a number of quarts of blood are taken from each horse. From the colorless part of this blood the serum is obtained, concentrated, sterilized, tested for potency, and packed with full directions for use.

I am advised that the Antivenin Institute will welcome visitors at

its Glenolden headquarters. Mr. Stadelman, who is in charge of the snake collection, will be glad to give demonstrations of the method of "milking" snakes, and to explain the preparation of Antivenin.

THE TREATMENT OF SNAKE-BITE

WHAT NOT TO DO.*

"Don't run or get overheated. Don't take any alcoholic stimulants. Circulation, increased by exercise or by alcohol, serves to distribute the poison much more rapidly through the body. Don't injure the tissues by injecting potassium permanganate, which is now known to be of no value as an antidote. Do not depend upon snake-bite "cures," or home-remedies commonly used. They are of no value. Do not cauterize the site of the bite with strong acids or the like."

WHAT TO DO IF ANTIVENIN IS NOT AT HAND.

"Apply a ligature or tourniquet a few inches above the bite. For this purpose use a rubber garter, a piece of small rubber tubing, a handkerchief, cord, or even a shoe-string. Do not bind the limb too tightly, but just tightly enough to retard circulation returning through the veins toward the heart. The sole object of the tourniquet is to delay absorption of the poison into the general circulation, but if it is applied too tightly or kept on too long, gangrene is likely to set in, with resulting destruction of the flesh in the affected area. It is important, therefore, to release the tourniquet every ten or fifteen minutes for about a minute at a time."

Resort to "incision and suction, both of which have been used in Texas in cases of bites inflicted by the Western Diamond-back Rattlesnake. Make a cross-cut incision at each fang-mark. For this purpose use a sharp clean knife or razor blade, and make the cut all the way through the skin, that is, about one-fourth of an inch deep and one-half an inch long. This allows some of the poisonous fluids to escape.

"The removal of toxic fluids may be increased by applying strong suction over these incisions. The suction may be done mechanically, if some apparatus, such as a breast-pump, is at hand. Suction should be kept up almost constantly until a physician takes charge of the treatment."

*Quoted from the "Directions for the Use of Antivenin (Nearctic Crotalidæ)" published by the Antivenin Institute of America.

TREATMENT OF SNAKE-BITE WITH ANTIVENIN.

If you are provided with Antivenin carefully read the instructions which come with every package containing the antidote and follow them literally without undue excitement. Do not wait for a physician, but apply the remedy yourself, or with the aid of a companion, but send for a physician at once. Fortunately Antivenin prepared by the Antivenin Institute of America can be obtained from hundreds of drugstores throughout the State of Pennsylvania.

It would be well for all people, who intend to camp in the woods, where there is danger of being bitten by a poisonous snake, before undertaking the excursion, to write to the Antivenin Institute of America at Glenolden, Penna., and obtain a supply of the remedy, as well as the literature which accompanied each package giving full directions for its employment, or to some druggist, who can supply the antidote and the directions for use.

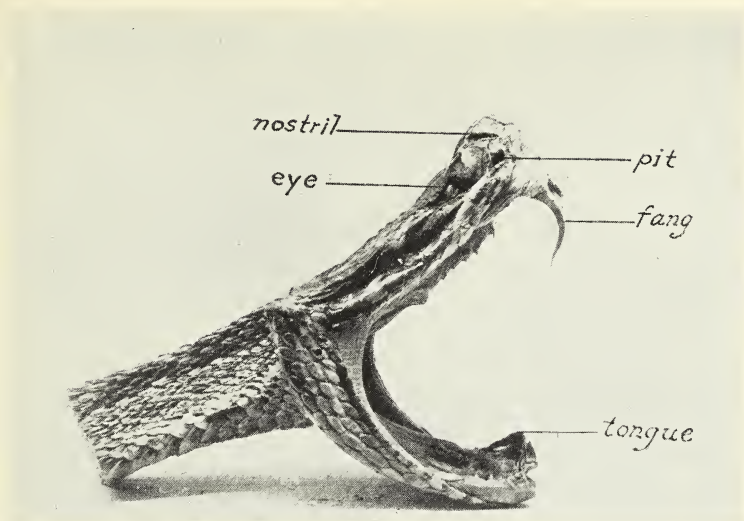


Fig. 1. Head of a Dried Rattlesnake.
(Photographed by M. Graham Netting.)

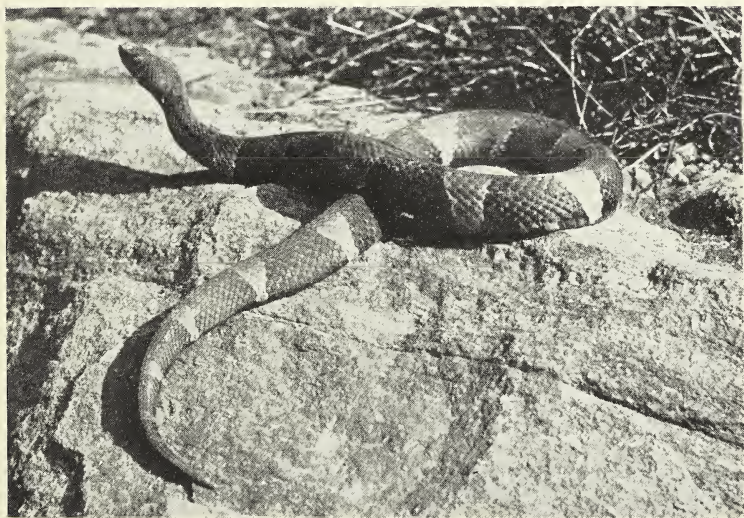


Fig. 2. The Copperhead.
(By permission of New York Zoölogical Society.)

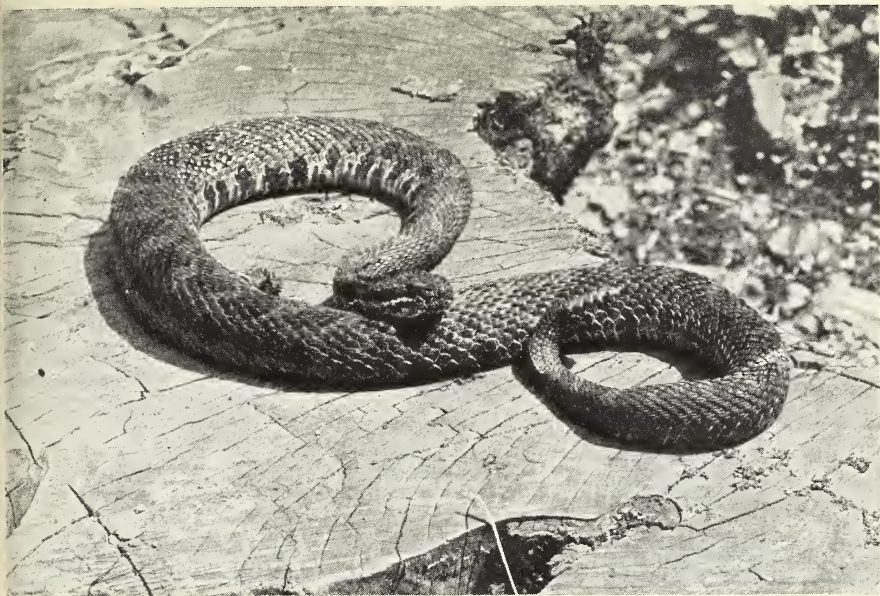


Fig. 1. Massasauga.
(By permission of New York Zoölogical Society.)



Fig. 2. Banded Rattlesnake
(By permission of New York Zoölogical Society.)

XV. NOTES ON SOME AMERICAN BUTTERFLIES, MAINLY
RELATING TO THEIR CLASSIFICATION
AND NOMENCLATURE.

PART I. PAPILIONIDÆ, PIERIDÆ, NYMPHALIDÆ
(DANAINÆ).

BY W. J. HOLLAND.

INTRODUCTORY.

I am engaged in revising and rewriting *The Butterfly Book*. The number of plates in the forthcoming edition will be increased from forty-eight to seventy, or more. My intention is to give figures of the types, or typical specimens, of all the species, which have been described or found to occur in Boreal America, many of which were not included in the earlier imprints of the book. I am at the same time correcting errors in nomenclature and classification which are found in the first edition.

For more than thirty years *The Butterfly Book* has been the only manual published covering the field north of Mexico and the Gulf. Nearly sixty thousand copies have been sold. In view of these facts I feel justified in bringing out a new edition, as nearly complete as possible. My desire is to provide the rising generation of students and lovers of nature with a work, which will enable them to satisfactorily pursue their studies, without being forced to amass a library of books, as I was compelled to do in my earlier years, when I began to study butterflies.

Of course it has been necessary for me to study everything which has been written upon the subject. In the course of these investigations I have encountered what I conceive to be occasional errors in identification made by fellow students, as well as not a few nomenclatorial innovations, which do not appeal to me as being worthy of general acceptance. Some of these things, as well as others, are discussed in the following pages.

A great deal of confusion was introduced into the nomenclature of the diurnal lepidoptera by the unfortunate action of one of my most

valued friends, the late Dr. Samuel H. Scudder, when in 1873 he reprinted Hübner's "Tentamen." Fortunately the status of this miserable little sheet has been settled, let us hope for all time, by the action of the International Commission on Zoölogical Nomenclature. Not only was the "Tentamen" not *published* as a "zoological record," but, as I myself have had occasion to point out (see *The Entomological News*, Vol. XXXIX, 1928, pp. 50-59) it has been thoroughly misunderstood and misinterpreted. Hübner addressed it merely as "as a note of inquiry" to certain of his scientific friends, and in it he was not proposing *generic* names, but the erection of what he called "*stirpes*," equivalent in modern parlance to what we understand as "*families*." The final action of the International Commission on Zoölogical Nomenclature has cleared the sky.

There are, however, a number of questions which arise as to generic and family-names, which still involve dispute. In the attempt with overwhelming zeal to strictly apply "the law of priority" a number of old and practically obsolete generic terms have recently been unearthed from their hiding-places in obscure and long forgotten documents. It is a question whether such summons from the tombs of the forgotten are justifiable. Where a name has been in current and almost universal use for a period of a century or more, and has become imbedded in the literature, including dictionaries and encyclopædias, it is exceedingly questionable whether it is wise, even if now and then a case can be made out for the older and forgotten term, to substitute it for a term which has been hitherto universally accepted. Scientific language is subject to the "law of usage" as well as to the "law of priority." Terms, which have become universally understood and universally used, should not be disturbed, except for the most cogent reasons.

I am reminded, that, when I was a student of Greek more than sixty years ago, our learned Professor called attention to the fact that the words "Telegraph" and "Telegram" did not conform to the requirements of the Greek language in its "Attic purity." The two first syllables, "tele" were derived from the Homeric dialect. The Professor stated that "had the man, who coined the words, known Greek as well as he understood electricity, he would have used the words *prosograph* and *prosogram*, or *porrograph* and *porrogram*." But he did not! The world today would laugh the proposition to scorn, if some Greek purist were to demand that the words "telegraph" and "tele-

gram" should be abolished from the vocabularies of mankind and "prosograph" and "prosogram" substituted for them. Along this line of thought I feel that the recent attempt, for instance, to substitute the name "Asciadæ" or "Asciidæ" for the family-name "Pieridæ" is ridiculous. Every lepidopterist the world over knows what is intended by the noun "Pieridæ," which for nearly a century has been in use. It is only recently that the new-fangled term "Asciidæ" has been put into print. It should be relegated to the rubbish heap of synonyms. In my humble judgment such innovations are wholly unnecessary and unwarranted. They may please those who invent them, but annoy everybody else.

A good deal of time and a good deal of ink and paper has been consumed in recent years by some of my learned friends, who are engaged in what they call "the fixation of types." I fear that in a number of cases these "fixations" leave matters "in a fix." In some cases I am quite certain that positive errors have been committed. In other cases I feel that the work, while possibly capable of argumentative defense, has been carried to extremes, which complicate, rather than clarify the situation. I do not overlook the value of determinations based upon a knowledge of specimens, which were actually before the writer when he wrote his descriptions. In multitudes of cases descriptions do not describe, and least of all those of the fathers of our science, and therefore, it is necessary when possible, to find the thing itself, and make sure what the writer intended to describe. Nevertheless I keenly feel that a good deal of the time-consuming work which has been done, has been more or less fruitless, and the results are merely the expression of the arbitrary opinion of an individual. I am particularly moved with feelings of disapprobation, when I find some of my learned colleagues stating in so many words and guiding their action by the dictum that species are not "specific organisms" but "specific names." This is a recent innovation in thinking in reference to the subject, which I repudiate. In scientific investigations we are dealing with *things*. The name is the "*tag*" which we attach to the thing. The most important step is to be sure what *thing* an author intended by the name he gave, as well as the name he may have with justice or erroneously applied. There has been an immense amount of jumbling of names and the nomenclatorist cannot reach certainty, except by ascertaining at the outset what is the *thing*, to which the author intended to give the name. The *thing* is

the *reality*; the *name* is only a *sign* for the thing. If a wrong name has been given to a thing, let us ascertain the fact, but do not let us undertake to *invent new names* because a wrong name has been given to a thing, when *valid names already exist* for that thing. The case is quite analogous to what often happens in our courts of justice, where men are found to have passed under what is styled an "alias." The judge brushes the "alias" aside and sentences the prisoner under his real name. He does not rebaptize the culprit under another name before sentencing him. Judges do not have baptismal fonts alongside their benches. But this is exactly what some of our nomenclatorists have recently been doing. I see no reason why entomologists, discovering that a species has been designated by a wrong name by some author, should arrogate to themselves rebaptismal rights, when by a little effort the identity of the thing before them can be ascertained, as well as the fact that it *already has a valid scientific designation*.

Another cause of confusion in the specific names of North American butterflies has recently been introduced through what I regard as an inconsiderate and over zealous application of Art. 35 of the *Code of Rules of Zoölogical Nomenclature*. Article 35 of the Code is as follows: "A specific name is to be rejected as a homonym when it has previously been used for some other species of the same genus."

It is well known by all students that the older authors, following Linnæus, recognized but one genus for the diurnal lepidoptera, to wit: *Papilio*. The result was the aggregation under this one generic name of a large number of species, well over a thousand, described or figured on the pages and plates of Linnæus, Clerck, Fabricius, Cramer, Drury, Smith and Abbot, and others. The genus *Papilio*, at the time of which I am writing was equivalent in value to the present Suborder *Rhopalocera*. Students, including Linnæus himself, recognized the incongruities of this procedure. Fabricius, the pupil of Linnæus, following Linnæus, subdivided the all-inclusive genus *Papilio* into groups, as everybody knows: "Equites Troes;" "Danai Candidi;" "Danai Festivi;" "Heliconii;" etc. These subdivisions are *nascent genera*, if I may so call them. Then quickly there arose genera in the modern and restricted sense, in which writers placed the species formerly "lumped" under the all-inclusive name *Papilio*. New families were established. The old genus *Papilio* in a short time was split into many genera, distributed into various families. To these the species named by the earlier authors were transferred, but their

specific names were carefully preserved, when identification was possible.

The evolution which took place in nomenclature, to which I have just alluded, appears to have been disregarded to some extent by some of my valued friends, Prof. Lindsey, Messrs. Barnes and Benjamin, and others. Barnes and Benjamin in their recently issued *List of the Diurnal Lepidoptera of Boreal America North of Mexico* on p. 4, give the following:

“† an unavailable name, usually a homonym.”

An examination of cases, in which the commonly accepted specific name is prefixed by a double dagger and another name is substituted, has often filled me with astonishment. As an illustration of what Messrs. Barnes and Benjamin have done, I may cite, as an instance, the case of the well known Hesperid, originally described by Smith and Abbot in 1797 as *Papilio lycidas*. This species, which for more than a century and a quarter has been known to all lepidopterists under this specific name, is now declared by Barnes and Benjamin to be in need of rebaptism, because, forsoothe, Cramer in 1779 had given the name *Papilio lycidas* to a true Papilionid (in the modern sense) which occurs in South America. But the Hesperid *Papilio lycidas* S. & A. is said by these authors to be closely related to the species *tityrus*, which, as early at least as 1793, had been placed by Fabricius in the genus *Hesperia*, subdivision *Urbicolæ*. It is now allocated to the genus *Achalarus* Scudder.

It seems to me in view of the definite development in classification, which took place over a hundred years ago, to be a wholly unnecessary procedure to hark back to the days of the *very infancy* of entomological nomenclature and to apply Art. 35 of the comparatively recently created “Code” to a case like this. The *Hesperiidæ* are as different from the *Papilionidæ* as Chipmunks are different from Tigers among the Mammalia. No good end whatever is subserved by the course adopted by my friends, upon whose work I am animadverting. When for one hundred and thirty-three years (to be exact) a specific name has been universally accepted for a species, the identity of which is in no manner in doubt, it is sheer violence to change the name, because it happens to be discovered that the same specific name was applied to an insect, which for one hundred and thirty-seven years has stood in another genus and in another family. This is a case in which obedience to “the letter” of a recently enacted law, which is properly

observed in later times under different conditions, "killeth." I, for one, am not such a strict legalist as to make retroactive a regulation, which, perhaps proper enough today, was unheard of at the time when the fathers of our science were engaged in untangling the mess created by the universal employment of the generic term *Papilio* for every butterfly upon the globe.

The laws governing "family-names" are as yet, so far as expressed in any code, more or less ill-defined. There is disorder and confusion in the application in practice of the scanty regulations which exist. The matter is ably discussed in the paper presented by Prof. A. L. Melander of the College of the City of New York at the Fourth International Entomological Congress at Ithaca, which has just appeared in the Transactions of the Congress, Vol. II, pp. 657-664. Family-names are quite as important as generic names. They should in the interest of science be "stabilized," as Melander has cogently pointed out. A stable, not a fluctuating, nomenclature is a primary requisite, antecedent to all intelligent scientific study and discussion. For myself I may say that I deprecate the continuous changing of family-names, under the prescription which has obtained vogue among a few that the "name of the family should be derived from the name of the oldest valid genus contained therein." There is no such "law" in any accepted code. The nearest approach to it is the "recommendation" of Strickland in 1842 that 'the oldest generic name should be employed by an author when erecting new family-names.' But this does not mean that old and long accepted family-names are to be *changed*, whenever it is discovered that an older generic name is included under the accepted family-name. Strickland's "recommendation" is now superseded by the International Code of Zoölogical Nomenclature, which is silent upon the subject. Family-names have been erected in the past and received wide, in many cases universal, acceptance for a hundred years; then comes forward some delver in obscure and forgotten tracts, announcing that he has found a paper, extant in only one or two copies on the shelves of inaccessible libraries, containing a name older than the one hitherto used as the basis of the family-name, and proceeds to accordingly change the family-name. Such unnecessary procedures should be disallowed by common consent. They only breed misconception. I am growing more firm in my conviction that the time has come when in entomological science, not to speak of the other branches of zoölogical science, the movement, already begun, to

establish "*nomina conservanda*," should be sedulously prosecuted. In this movement lies our greatest hope for the attainment of a "stable nomenclature."

Family PAPILIONIDÆ.

SUBFAMILY PAPILIONINÆ.

Genus PAPILIO Linnæus.

Papilio devilliersi Godart.

Barnes and Benjamin in their "List" star this species, thereby implying its doubtful occurrence in the United States. However, there are several specimens in the Academy of Natural Sciences in Philadelphia, which undoubtedly were taken in southern Florida, thus confirming the statement of Boisduval and Leconte that it is found in that State.

Papilio ponceana Schaus.

This species has by some compilers been listed as a variety of *P. aristodemus* Esper. It is indeed allied to *P. aristodemus* and belongs to the same group, but it appears to be so different and so well defined and constant in its features, that it should be accorded specific rank. At a glance it reveals itself as distinct from typical *P. aristodemus*.

Papilio daunus Boisduval.

In 1836 Boisduval named and described a *Papilio* (in the restricted and modern sense) from California, calling it *Papilio daunus*. Barnes and Benjamin in their *List of the Diurnal Lepidoptera of Boreal America*, etc., p. 5, prefix a double dagger to the name *daunus* Boisd., sinking it as an "unavailable name," because Cramer had used the same specific name for a species of Hesperid, placed by Cramer himself in the *Urbicolæ*. Deprived thus of the name, which ever since 1836 had been consistently used by all authors, Barnes and Benjamin apply to it the name "*multicaudata* Kirby." This is certainly a most remarkable procedure.

In 1884 in "Papilio," Vol. IV, pp. 103-4, the late W. F. Kirby wrote an article calling attention to the fact that he had unearthed in the library of the British Museum of Natural History a printed wrapper enclosing some unnumbered pages and a few plates. The front page of the wrapper bears the title: "Lepidoptera Americana," etc., and gives as the name of the author, Titian R. Peale, the well known

artist and proprietor of "Peale's Museum" in Philadelphia. On the third page of the wrapper is a prospectus, announcing the intention of Peale to publish a work under the above name to be accompanied by one hundred colored plates. The front cover-page shows that it was printed in 1833. Plate I, unaccompanied by text, gives an uncolored figure of a butterfly named *P. multicaudata* on the plate. This Kirby in his paper identifies as being *Papilio daunus* of Boisduval. Rothschild and Jordan in their great monographic "Revision of the American Papilios" (Nov. Zoöl., XIII, 1906, p. 589), cite as the only synonym known for *Papilio daunus*, "*Papilio multicaudata* Kirby (ex Peale ined.) *Papilio* IV, p. 104 (1884) (= *daunus* Boisd.)."

If Kirby's account of Peale's work is to be regarded as its first publication, *multicaudata* must be treated as a synonym, for Boisduval published in 1836 and Kirby in 1884. If the name *multicaudata* is to be employed as valid it should not be credited to Kirby, who did not republish Peale's paper, but merely wrote an account of it, but to Peale himself (1833). However, according to all established rules and precedents Peale's effort, whatever he intended to do, cannot be accepted as having been "published." I agree in this with Rothschild and Jordan. So far as I have been able to ascertain, there are only two copies of Peale's pages and partly finished plates in existence: the one (described by Kirby) in the Library of the British Museum of Natural History; the other, less complete, in the Library of the Academy of Natural Sciences in Philadelphia. Mr. W. J. Fox, the Librarian of the latter institution, has kindly written me that their copy "consists of fourteen pages of text relating to four colored plates: *Saturnia promethea*, female; *Saturnia promethea*, male; *Lasiocampa io*; *Danaus plexippus*. These plates are numbered 3, 4, 5, and 7 respectively. The other six plates referred to by Kirby I take were intended for a later part of the work."

The substitution of the name *multicaudata*, with attribution to Kirby, only known from the unfinished plate of Peale in the British Museum, for the name *daunus* Boisd., which has been consistently used for nearly a century by scores of authors, is wholly indefensible. The fact that Cramer had given the same specific name to a Hesperid, located by Fabricius in the *Urbicolæ*, long before Boisduval wrote, does not in my opinion convert the name of the Papilionid into a "homonym," thus preventing its use.

By the by, as *Papilio* is a masculine noun, the specific name

should in any event be written *multicaudatus* and not *multicaudata*. Peale forgot his Latin, if he ever had any.

WHAT IS THE TRUE SCIENTIFIC NAME OF THE PAPAW-BUTTERFLY?

Aurivillius in his "Recensio Critica, Lep. Mus. Lud. Ulr.," p. 30, says: that 'the name *ajax* should be given to the summer and fall forms of the species commonly known as *ajax* by authors.'

Rothschild and Jordan in their *Revision of the American Papilios* (Nov. Zoöl. XIII, p. 414) say:

"If Linné had been quite precise in the application of his names, fixing each name to one particular specimen or a previously published figure or description, we should not now be in such a peculiar predicament with regard to his *Papilio ajax* as we are placed in. As said above, the description of this *P. ajax* and the two references given beneath it contradict one another, each applying, without the slightest doubt, to a different insect. The description fits the *Papilio* described later as *polyxenes* by Fabricius and as *asterius* by Cramer, and does not agree with the species which is generally known as *P. ajax*. If we had here to do with some little-known insects, we should hardly hesitate to apply the name *ajax* L. to the insect figured as such by Clerck—namely, *polyxenes* Fabr.

"However, there is an enormous literature on both these insects, and the replacement of the names *polyxenes* or *asterius* by *ajax* would lead to endless confusion. The whole mischief is occasioned by Linné's reference under *P. ajax* to Edwards's figure. Now, this reference Linné himself removed to *P. protesilaus* in 1764.* Under this same name *protesilaus* we find in 1758, 1764, and 1767 a reference to a figure in Catesby which represents the same insect as Edwards's. And in 1767 Linné described *Papilio xuthus* as being similar to *P. ajax*, which would have been quite ludicrous if Linné's *ajax* had been the insect now so called. There is a remote possibility that Linné described *ajax* from a male of *P. glaucus*. For this reason we have thought it advisable to overcome the difficulty by rejecting the name *ajax* altogether on the ground of its being of doubtful application.

"The name *ajax* does not appear in Linné's *Museum Ludovicæ Ulricæ*; this is unfortunate, since the descriptions given in that work

* It does not appear under *protesilaus* in the edition of 1767 and later.

are far superior to those of the *Systema Naturæ* of 1758 and 1767."

A perusal of the foregoing remarks of Aurivillius and of Rothschild and Jordan have led me to a re-examination of the entire subject *de novo*.

Linnæus in the *Systema Naturæ*, Edition X, 1758, p. 462, prints the following:

"Ajax. 26. P. E. alis obtuse caudatis concoloribus fuscis; fasciis flavecentibus, angulo ani fulvo. *Raj. ins.* III, n. 2. Edw. *av.* 34. *Habitat in America boreali.*"

The foregoing description is extremely vague, "*dubia*," as Aurivillius calls it. Literally translated it is: "Papilio Eques with obtusely tailed wings uniformly fuscous, with bands inclining to yellowish, the anal angle fulvous."

The description given by Linnæus really does not describe. He, however, cites Ray's *Insects* and Edwards's *Birds*. An examination of Ray shows that the insect he had in mind was the one figured by Mouffet in his *Theatrum Insectorum*, and this really is the picture of the butterfly, the original drawing of which I reproduced in the *Scientific Monthly*, Vol. XXIX, pp. 45-48, July 1929, as "the first picture of an American butterfly." It in fact is a crude, but recognizable, drawing of *Papilio turnus*. Its identity established, and it being therefore, as the Germans say, "ausgeschlossen," we must turn to the figure given by Edwards.

A reference to Edwards's 34th plate in Vol. I of his "Natural History of Uncommon Birds," (1743), reveals a very good figure of the seasonal form of the Papaw-butterfly, which in 1865 was designated as *telamonides* by the Felders. The figure given by Edwards can be exactly matched by numerous specimens in my possession. Edwards says: "This fly was given me by Dr. R. M. Massey, who told me he had it from Maryland."

Linnæus, *l.c.* p. 463, prints the following:

"Protesilaus 29. P. E. alis caudatis subconcoloribus albidis; fasciis fuscis; unica subtus sanguinea, angulo ani rubro.

Pet. mus. 50. n. 502.

Sloan. jam. 2, p. 218, t. 239. f. 1, 2.

Mer. surin. 43. t. 43.

Seb. mus. 1. t. 11. f. 2.

Catesb. car. 2. t. 100.

Habitat in America septentrionali.

Simillimus Podalirio Europæ australis & Africæ; an satis diversus?"

A scrutiny of the references given by Linnæus indicates that the second, third, and fourth refer to neotropical insects. The first and fifth refer to recognizable figures of the Papaw-butterfly, especially the figure given by Catesby. The second volume of Catesby's work appeared originally in the year 1743; two subsequent editions appeared under the editorship of George Edwards, a well known ornithologist and naturalist of his day. The last edition, issued in 1771, is before me. Referring to the insect cited by Linnæus accompanying Pl. 100, I find the following:

"*PAPILIO caudatus* Carolinianus; fuscus, striis pallescentibus; lineæ et maculis sanguineis subtus ornatus. Pet. Mus. p. 50. No. 508.

"The back of this Butterfly is black, as is the ground of the four wings: several white lists* cross the upper wings obliquely: the two under wings have likewise two white lists extending downwards: they have besides four white spots, with one red and a blue spot in each wing; the under side of the wing, besides several white lines, has two red, and three blue spots."

Cramer, Pap. Exot. Vol. I, t. 98, figs. G, H, in 1779 applied the specific name *marcellus* to the insect figured by Catesby and named by Edwards *carolinianus*. The name *carolinianus* has, therefore, priority over *marcellus* Cramer. This fact appears to have been entirely overlooked by Kirby, Rothschild and Jordan, and other investigators.

In Gmelin's edition of Linnæus' Systema Naturæ, Vol. V, 1788, p. 2238, *marcellus* Cramer is listed as a synonym for *ajax* Linnæus.

A careful study of all the editions of the Systema Naturæ since the publication of the Tenth Edition fails to disclose that Linnæus, or subsequent editors of the work, accepted Clerck's figure of *ajax* (*polyxenes* Fabricius), as equivalent to *ajax* Linnæus.

The action of Messrs. Barnes and Benjamin in substituting *ajax* in their "List" for the familiar name *polyxenes* on the strength of Clerck's figure published in his *Icones* appears to me to be a very rash and wholly unnecessary innovation, in face of what had been already said by Rothschild and Jordan in regard to the "endless confusion," which would result from such a course. Clerck (1764) and Barnes and Benjamin (1926) are the only writers who can be cited for such employment of the name *ajax* in the annals of science covering one hundred and sixty-two years.

*A now almost obsolete English word for a *stripe*, or *band*.

After a careful review of the subject from all angles I fail to agree with my good friends, Messrs. Rothschild and Jordan in discarding the name *ajax*. The reference by Linnæus to Edwards's figure, which is undeniably that of our common Papaw-butterfly, seems to me to furnish the best clue to a way out of this nomenclatorial muddle, especially in view of the fact that this concept of what really is the species, which should be designated by the specific name *ajax*, has run down through almost the entire literature since Linnæus wrote, or his works were edited by others. To my mind the best alternative is to accept and employ as *nomen conservandum* the name sanctioned by nearly a century and a half of use. I come back after a faithful study of the subject to the opinion of Dr. Aurivillius already quoted.

The synonymy of the species works out as follows:

***Papilio ajax* Linnæus.**

(Type: Fig. given by Edwards, "Nat. Hist. Birds," 1743, Pl. 34, cited by Linnæus) = form *telamonides* Felder (1865).

P. protesilaus L. (partim) (L. cites Petiver's and Catesby's figures = *ajax* auctorum).

Form *carolinianus* George Edwards, in Catesby, "Nat. Hist. Carolina, etc." 3rd Edit., Vol. II, 1771, p. 100, pl. 100.

= *P. marcellus* Cramer, Lep. Exot., pt. II, 1779, p. 4, pl. XCVIII, figs. F, G.

Family PIERIDÆ (Piérides Boisd., 1836)

Type of Family: Genus PIERIS Schrank.

Genotype: *P. rapæ* Linnæus.

SYNONYMS: *Asciadæ* Hampson, 1918. (Type *Ascia* Scopoli, genotype *crataegi* L. fide Hampson). But *crataegi* is type of *Aporia* Hübn. *Asciidæ* Lindsey, 1922. (Type *monuste* L., fide Scudder.)

I rebel vigorously against the substitution of the newly coined family-name *Asciidæ* for the well known family-name *Pieridæ*, which has been in use among all lepidopterists since 1836. The family-name *Asciidæ* founded upon the genus *Ascia* of Scopoli (type *monuste* L., Scudder) is a recent invention, wholly unfamiliar in the literature of our science, and is an innovation for which there is no legal authorization. Names, including family-names, are vocables, by which things are known. Every student of the lepidoptera knows what is meant by

the *Pieridæ*. The name is firmly imbedded in the whole literature of entomology; is found in every dictionary of repute, and to substitute for it the newly invented term *Asciidæ* seems to me to be a wholly unnecessary procedure, especially in view of the well known fact that there is, to quote Dr. A. L. Melander (Trans. Fourth Entomological Congress, Vol. II, p. 660), "No authorization for the mandatory election of the earliest described genus as type for a family, other than the recommendation in the original Stricklandian Code of 1842," replaced by the "International Code," which is silent on the subject. It is an obsession with some recent writers that they are under compulsion to change family-names, whenever they can find an older generic name as a pretext for so doing. But there is no law in force today, which makes it compulsory to adopt the oldest generic name as the basis for family-names. The proposed change from *Pieridæ* to *Asciidæ* is "a work of supererogation." The botanists are wiser in this matter than the zoölogists. Article 20 of the Botanical Code provides that 'names which have come into general use during the fifty years after publication shall be *nomina conservanda*.'

Is it too much for an entomologist to demand, in the absence of any rule to the contrary, that family-names, consistently used for from seventy-five to a hundred years without challenge, shall be conserved? Is our nomenclature to be completely upset every now and then at the behest of an innovator, applying so-called "laws," which exist only in the imagination?

Besides, *Ascia* Scopoli (type *monuste* L., Scudder) is not strictly speaking congeneric with *Pieris* (type *rapæ* L., Schrank). The *Pieridæ* of the *monuste*-group may be macroscopically distinguished from those of the *Rapæ*-group by their more robust structure, differently shaped primaries, and microscopically by other features. *Ascia* is not strictly synonymous with *Pieris*, though so treated by some authors.

WHAT IS THE TRUE SCIENTIFIC NAME OF THE FLORIDA WHITE?

In the first edition of *The Butterfly Book* I placed this species in the genus *Tachyris* Wallace, which is now conceded to be synonymous with *Appias* Hübner. In 1870 Butler erected the genus *Daptonoura* for the neotropical group of Pierids, which are allied to the oriental group now referred to *Appias*. Butler made *Papilio lycimnia*

Cramer the type of his genus *Daptonoura*. However, Swainson (Zoöl. Ill., 2d Series, Pl. 79, 1831-2), had already erected the genus *Melete* with *lycimnia* (*limnobia*) as type. Butler's genus *Daptonoura* falls before *Melete* Swainson. A careful study shows that the neotropical butterflies belonging to *Melete* (*Daptonoura* Butler) are distinct from those which are properly referred to *Appias* Hübner, not only differing in the neuration of their wings, but also genitally. I therefore propose to employ Swainson's generic name for the neotropical species, of which there are a number, only one of which, *ilaire* (Godart), is found within the limits of the United States. The name of this well known butterfly, therefore, is *Melete ilaire* (Godart).

Röber in Seitz has sunk the specific name *ilaire* Godart as a synonym of *drusilla* Cramer. (Pap. Exot. II, p. 21, pl. CX, fig. C). I question the correctness of this determination in view of Cramer's statement that the insect, which he figured, came from Batavia in Java, and further because Cramer's figure does not at all agree with specimens of *ilaire*, but does show considerable likeness to the females of certain oriental species of *Appias*.

A curious error was made by Röber in this connection in naming the female I figured in *The Butterfly Book*, Pl. XXXV, fig. 5, "*Appias drusilla* ab. ♂, *hollandi*." Unfortunately Dr. Röber's statement that the insect figured by me is a *male* is quite incorrect. It is a female, as the genitalia show; and is the usual form of the female occurring in southern Florida, as long series of specimens reveal. It had already been named var. *neumægeni* by Skinner, before Dr. Röber rebaptized the insect under the name of the present writer.

The synonymy is as follows:

***Melete ilaire* (Godart).**

SYNONYMS: *mysia* (Godart); *margarita* (Hübner); *molpodia* (Hübner); *drusilla* Röber (not Cramer).

Var. *poeyi* (Butler). Small Cuban form.

Dimorph. ♀, *neumægeni* (Skinner) = *hollandi* (Röber). Florida.

Genus *COLIAS* Fabricius.

(Genotype *hyale* L.)

Synonym: *Eurymus* Horsfield, Cat. Lep. East Ind. Mus., 1829, pp. 129-30 (Type *hyale* L.); Swainson, Zoöl. Ill., (2) Pls. 60, 70 (1831) (type *philodice* Godart). *Eurymus* is preoccupied in the *Coleoptera* by Rafinesque, Analyse de la Nature, etc., p. 117, 1815 (Cf. Sherborn, Index Animalium 1801-50, p. 2247).

Horsfield in his "Catalogue &c," published in 1829, employs the generic name *Eurymus*, which he tells us 'had been given him by Swainson about eight years previously.' The name cannot be credited to Swainson, for the latter did not employ it in his published writings until 1831. His use of it, perhaps in labelling specimens in his cabinets, did not constitute "publication," and in spite of the profuse thanks which Swainson showered upon Dr. Horsfield for adopting his "manuscript name" (Cf. Zool. Ill., 2d Series, Vol. II, Pl. 60), Horsfield must be accepted as the author of the name. But the name is preoccupied in the *Coleoptera*, a fact which had escaped the notice of Swainson, Horsfield, and Scudder. The name falls as *nomen preoccupatum*.

I see no good reason for rejecting the name *Colias* originally used by Fabricius (1807) for the species *palæno*, *hyale*, *glaucippe*, *ramni*, and *cleopatra*. The species *ramni* became the type of the genus *Gonepteryx* Leach in 1815, one hundred and fifteen years ago, and *cleopatra* went with it, the two being congeneric. The oriental species, *glaucippe*, was transferred to the genus *Hebomoia* by Hübner in 1819 (?). This left *palæno* and *hyale*, which are congeneric, in *Colias*. But it is objected that Latreille, who in 1809 included in *Colias* the species *ramni*, *cleopatra*, and *hyale*, in 1810 only cites *ramni* as the type of a "*Coliade*." It is claimed that this restricts the generic name *Colias* to the species *ramni*, which is not according to modern views congeneric with *hyale*. But did Latreille really intend to make such a narrow restriction? I very much doubt that he did. Publishing in 1809 the genus *Colias*, according to Latreille himself, included the species *ramni*, *cleopatra*, and *hyale*. Publishing the next year he only cites the first of these species as a "*Coliade*" but fails to make provision for *hyale* in another genus. According to my view his action in the "Considerations" in 1810 should be interpreted in the light of his fuller statement published the year before in his *Genera Crustaceorum et Insectorum, etc.*, Vol. IV, p. 204. When Leach in 1815 took *ramni* as the type of his new genus *Gonepteryx*, he left *hyale* in the genus *Colias* and accordingly distinctly specifies *hyale* as the type of the genus *Colias*, from which he had removed *ramni*.

This status of the case was accepted as fixed by almost all authors and students, including Scudder himself as late as 1872. Then Scudder in 1875 reversed himself, saying that *ramni* must be accepted as the type of *Colias*, because of the action of Latreille in 1810. Scudder's reversal of himself has since then been almost universally ignored, and

little or no attention has been paid to it. Almost all scientific as well as popular books on butterflies recognize *Gonepteryx rhamni* as the name of the "Brimstone," and the "Clouded Sulphur" as *Gonepteryx cleopatra*.

The employment of *Eurymus* for the genus by Horsfield in 1829 must be disregarded, as has been already pointed out, because of the preoccupation of the name in the Coleoptera.

The generic name *Colias*, sanctioned by use for much more than a century by almost all students and writers, "is good enough for me." It is currently employed by almost all authors throughout the world to designate the "Sulphurs."

Genus ASCIA Scopoli.

Ascia Scopoli may be properly used as the generic name for the species *monuste* Linnæus, and some allied forms found in the American tropics. They are separable from the boreal species by the different outline of the primaries and their more robust structure.

Genus PIERIS Schrank.

(Type *Papilio rapæ* L.)

The genus should be restricted to the smaller and more delicately formed insects, generally referred to it, such as *rapæ* (L.), *napi* (L.), *beckeri* (Edw.), *occidentalis* (Reak.), etc.

Genus EUREMA Hübner (1819).

The type of this genus is *delia* Cramer (*Danai candidi*). Barnes and Benjamin in their list correctly cite *delia* Cram. as the genotype, but prefix a double dagger to the name *delia* adding "(nec D. & S.)." After a study of the facts in the case this appears to be an instance in which the application of Art. 35 of the Code seems to me to lead to confusion. Denis and Schiffermueller (Wiener Verz., p. 179, No. 6, 1776) gave the name *Papilio delia* to an insect which they separated from the true *Papilios* (*Papiliones Equites* L.) and allocated to the subdivision to which they applied the name "*Papiliones variagatæ*" (sic) equivalent to the genus *Melitæa*, including the species *phæbe*, *maturna*, *dictynna*, *cinxia*, et al. *P. variegata delia* D. & S. is a synonym for *Melitæa cinxia* (L.) as every student knows. Cramer, Lep. Exot. III, 1782, p. 144, Pl. CCLXXIII, fig. A) describes and depicts

a species as *Papilio delia*, which he locates among the *Danai candidi* = *Pieridæ*. It seems to me to be an ultra-rigid and uncalled for application of the rule governing homonyms to make the name *delia*, applied by Cramer to a well-known *Pierid*, a homonym because Denis and Schiffermueller gave the same specific name to a "*Papilio variegata*" i.e. to a *Melitæa*. Such upsetting of well known names under the application of a modern and hitherto unconstrued rule seems to me, at least, to be uncalled for. The substitution of Hübner's specific name *demoditas* I regard as a violation of the "everlasting fitness of things." The specific name *daira* Godart perhaps has precedence over *demoditas*, as is pointed out by Klotz (Ent. Americana, New Series, Vol. IX, No. 3, 1928, p. 127). But I cannot help feeling that to treat *delia* Cram. as a homonym of *delia* D. & S. is such a strained and unnecessary procedure, that I shall conserve in my work the specific name given by Cramer and sanctioned by constant use for at least a century. What is the use of changing names, the significance and application of which are thoroughly understood by all careful students and experts in this branch of science, because both forms were originally called *butterflies* (*Papiliones*) but, even thus, located in different categories (Nascent genera)?

Genus GONEPTERYX Leach (1815).

(Synonym *Amynthia* Swainson, 1831-32).

Swainson in his Zoölogical Illustrations, 2nd Ser., Pl. 65 (1831-32) erected the genus *Amynthia* and cited *merula* (recte *mærule* Fabr.) as the type. On the plate he depicts *swainsonia* (Leach MS.). But this name is a synonym for *clorinde* (Godart).

Most authors have sunk *Amynthia* Swainson as being synonymous with *Gonepteryx* Leach. I strongly sympathize with this view. Swainson says that the two genera are separated "by the peculiar construction of the feet," but fails to point out in what these differences consist. I have made careful examination of the feet of *Gonepteryx rhamni* and *Amynthia mærule* and *A. clorinde*. The only differences I can detect are that in the two American insects the first or upper joint of the tarsus is relatively longer and slenderer than in *G. rhamni* and not so heavily clothed with appressed scales as in the latter. This is a very slight basis upon which to base a generic distinction. In all other respects, except size, the two forms appear to absolutely agree. The American species are among the giants of the

genus. But mere size should not constitute the basis for generic separation. Kirby and Röber have treated *Amynthia* Swainson as a pure synonym of *Gonepteryx* Leach. After careful consideration I pursue the same course.

Family NYMPHALIDÆ.

SUBFAMILY DANAINÆ.

Genus DANAIS Latreille.

Danais plexippus (Linnaeus). The Monarch Butterfly.

The question as to the proper specific name for the Monarch Butterfly has been elucidated by the recent researches of Captain N. D. Riley of the British Museum, who has examined the Linnean specimens, which are preserved in London (*Cf.* Trans. Ent. Soc. Lond., Vol. LXXVI, Pt. 2, Jan. 1929, p. 451).

Captain Riley has clearly shown that the specimens in the Linnean collection were rearranged by J. E. Smith, who served in the early days as their Curator, and took great liberties with them. Smith evidently transposed some of the labels. Riley says:

"As Dr. Verity has shown (*J. Linn. Soc., Zoöl.*, xxxii, p. 173, 1913), with a little practice it is possible to recognise from among the mass of specimens that now compose the 'Linnean collection,' preserved at the Linnean Society's rooms in Piccadilly, those specimens that were without doubt Linnean, in spite of the great additions made by Smith. Of the species involved in this discussion there are now 5 specimens in this collection, and I have no hesitation in saying that the only Linnean specimen is a solitary male of the N. American Monarch. It bears a label in Smith's writing "*archippus* Fab." On the other hand, one of the 4 non-Linnean specimens bears a label also in Smith's handwriting "*plexippus*," and, stranger still, a second label in Linné's own writing "*80 plexippus*!" (80 is the number of the species in *Syst. Nat.*, Ed. X). Linné could not have put this label on a specimen he never possessed. It is notorious that Smith extensively altered the Linnean collection from its original state, making additions, changing names and even from time to time giving away parts of it in exchange. It is justifiable therefore, I consider, to assume that Smith, when Fabricius had forced the adoption of the name in the later (*Mus. Ludov. Ulric*) sense, merely transferred the Linnean label from the real type specimen to one of his own specimens, so as to "keep the col-

lection up to date." The species is marked with an underscore in Linné's annotated copy of the 10th edition, indicating that it was represented in his collection. It is not underscored in his annotated copy of the 12th edition (*see* Jackson, Cat. Linn. Specimens, *Proc. Linn. Soc.*, Suppl. 1913)."

It is also very significant, as Riley has shown, that in the original manuscript of the *Systema Naturæ*, Ed. X, which is still extant, the note appended to the printed description of *plexippus*, which compares it with the following species, *i.e.* *chrysippus*, is wanting. It was probably inserted by Linnæus when reading the proof.

From the foregoing it is evident that Linnæus had a specimen of the Monarch in his collection at the time he wrote his description of *plexippus*. His reference to Petiver's specimen, to Sloane's figure, and to Cramer's figure may therefore be disregarded. Catesby's figure, to which he refers, is a very good likeness of the insect which he had before him. Students are, therefore, right in giving the specific name *plexippus* to this North American insect. The Asiatic form will carry the name *genutia* Cramer, which has been applied to it by many authors. This of course runs counter to the opinion of Aurivillius, to which the writer until recently had been inclined to give way. (*Cf.* Transactions Fourth Int. Ent. Congress, p. 691). The writer now believes that the correct solution of this perplexing problem has been found, thus ending a discussion which has lasted for half a century. The specific name *menippe* Hübner is a pure synonym.

Under a strict application of the law of priority the name of the genus might be determined as being *Danaida* Latreille. Latreille, however, amended this to *Danais* (*Cf.* Holland, Bulletin Amer. Mus. Nat. Hist., XLIII, 1920, p. 118), which has almost universally since been employed by writers. There does not appear to me to be any good practical reason at this late date for restoring *Danaida*, though a few authors have recently employed it. The use of *Danaus* Linnæus is indefensible.

It may be proper at this point for the information of entomologists, who do not possess a classical education, to state that the word *Plexippus* derived from the Greek, *ἵππος*, δ, ῥ, while having a masculine termination, is of either gender, and in the combination *Danais plexippus* is feminine. The correct scientific name of the Monarch Butterfly is then *Danais plexippus* Linnæus. Under this

name I shall designate this insect in my new edition of *The Butterfly Book*, treating the generic name *Anosia* Scudder as a synonym.

Genus DYNOTHEA Reakirt.

This generic name should be sunk as a synonym of *Ithomia* Hübner.

(*To be continued*)

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*Issued as separate, Jan. 21, 1930.

**Issued as separate, Feb. 13, 1930.

ANNALS

OF THE

CARNEGIE MUSEUM

VOLUME XIX, NO. 4

EDITORIAL NOTES.

Mr. Rudyerd Boulton returned to the Museum in April, after spending more than a year in Africa. Mr. Boulton and his wife originally went out to act as the companions of Mrs. Oscar Straus on an African tour sponsored by her, covering the valley of the Nile and the northern equatorial portions of the continent under British control. On this part of the journey collections were made with the understanding that these were to be transmitted to the American Museum of Natural History in New York, with the proviso, however, that, as Mr. Boulton's salary was being paid by the Carnegie Museum, the latter institution would receive some portions of the collection made by him.

After the return of Mrs. Straus Mr. Boulton devoted the remainder of his stay in Africa to collecting exclusively for the Carnegie Museum, mainly in south central and southern Africa. He was highly successful, devoting himself principally to the collection of birds. The ornithological material returned by him includes a number of desirable and even rare species. In addition to the birds his collection includes a good many mammals and a considerable number of insects and other invertebrates. Through the agency of Mr. Boulton the Museum acquired a considerable collection of birds and insects taken in Nyasaland by Mr. Rodney C. Wood, a well known and competent field-naturalist.

Mr. Graham Netting and Mr. Harold J. Clement have returned from their trip to Venezuela bringing with them collections of birds, reptiles, and an extensive series of insects of all orders.

Mr. John B. Semple once more has sponsored an ornithological excursion to the north. Mr. W. E. Clyde Todd started for Labrador, leaving in February. He proposes to remain in the north until August. He plans during the summer to go to Southampton Island in Hudson Bay, where Mr. George M. Sutton passed the winter and is staying to make ornithological observations and collections. The Museum is greatly indebted to the kind liberality of Mr. Semple, who for many years has shown a deep interest in our researches in the north and has generously contributed to their success.

Mr. J. LeRoy Kay has returned to Utah to continue the paleontological investigations, which we are making near Vernal. The quarry opened by him last year has already yielded much valuable material including a large series of Titanotheres.

Mr. Ottmar F. von Fuehrer and Mr. Harold J. Clement repaired to Florida in May to collect material for two habitat-groups, one of which will show tropical vegetation, the other crocodiles and alligators in their natural environment.

We have recently acquired some good collections of West African birds and insects from our friends, A. I. Good and Jacob Reis, who have for many years collected for us in western equatorial Africa. The construction of roads through Cameroon and the introduction of automobiles has greatly changed conditions. A highway has been completed through the hinterland of Cameroon and has been nearly completed as far north as Lake Tschad. A road has also been constructed eastward through the tropical forests. Journeys, which a few years ago were tediously made on foot, can now be rapidly made and parts of the interesting territory, hitherto scantily represented in our collections, have become accessible, so that the recent collections brought to the Museum contain numerous species from the northern and eastern part of Cameroon, which prove highly interesting, revealing, as they do, the transition from the jungles to the more open grass-lands in the north and the northeast. Although these collections have not yet been carefully studied, it is pleasing to recognize, especially among the lepidoptera, a number of forms which hitherto were only represented in our collections by a few specimens purchased many years ago from European dealers.

An exhibition of works of art under the patronage of "The Scholastic" was held in May. It included drawings, paintings, sculptures, and articles of jewelry produced by pupils in the schools of the United States. The display was unusually successful and commendable. The exhibition included entries for the "Carnegie Museum Project," which calls for the adaptation of different living forms to decorative purposes. This particular problem met with a very wide and encouraging response from schools all over the country. The work revealed the existence of great artistic ability in the youth of the land.

A large and important collection of carvings in wood has been presented to the Museum by Mr. R. B. Mellon. The collection was made by Mr. Samuel Yellin, a noted antiquarian and worker in metal in Philadelphia. There are between three and four hundred specimens illustrating the art of wood-carving in the Middle Ages and the period of the Renaissance. The specimens represent different countries in Europe. It is hoped that arrangements may speedily be made to install this beautiful collection in a fitting manner.

Mr. Frederick Schaefer has generously given the Carnegie Museum six hundred dollars to enable us to acquire the monumental collection of photographic plates illustrating fossil foraminifera prepared by Dr. J. J. Galloway of Columbia University.

Among other distinguished visitors to the Museum in recent months was Dr. Nicholas Jorga, President of the University of Bucharest.

On the first day of April the Editor of the *Annals* accompanied by Mr. Louis S. Coggeshall, started for the City of Mexico for the purpose of installing in the National Museum of Natural History a replica of *Diplodocus carnegiei*.

About two years ago a request for a replica like those presented to the national museums of other countries was preferred to us through the Mexican Ambassador in Washington, Sr. Manuel C. Tellez. The matter was taken up with Mrs. Andrew Carnegie and the Trustees of the Carnegie Corporation of New York. It was recognized that the presentation of such a gift was in the line of the wishes of the generous founder of the Corporation, and a grant was made from the fund which has hitherto annually been set apart by the Corporation to be

applied to causes, which Mr. Carnegie was in the habit of aiding. The replica was made under the supervision of the Director Emeritus of the Museum, and was completed in the fall of 1929. Immediately thereafter it was forwarded to Mexico in thirty-six large boxes. In this connection mention should be made of the great courtesy of the Pennsylvania Railroad, the Louisville and Nashville Railway, the Southern Pacific Railroad, and the Texas-Mexican Railway Company, who kindly joined with the National Railways of Mexico in granting free transportation from Pittsburgh to the City of Mexico. The replica went forward in a freight-car in which the boxes were carefully loaded, and braced at the East Liberty Station of the Pennsylvania Railroad under the direction of Mr. H. H. Gray, the Divisional Superintendent of Freight Traffic of the Pennsylvania Lines West, and Mr. A. D. Camlin, the Agent in charge at the East Liberty Station, whose kindness can never be forgotten. The replica arrived in Mexico without the slightest damage.

Owing to pressing duties it was not possible for the writer for four months to undertake the work of installing the specimen upon the bases which had been provided. Meanwhile the boxes were held in safe storage at the Museum. In the interim a change in the administration of the Museum had taken place, it having been transferred from the care of the *Secretaria de Agricultura y Fomento* to that of the *Universidad Nacional de Mexico* under the direction of Dr. I. Ocho-terena. Our original correspondence in reference to the matter had been with Dr. A. J. Herrera, who, when the change in control took place, had resigned.

On our arrival in the City of Mexico on the evening of April 5th we were cordially met by the new Director of the National Museum and a deputation of Professors from the University and the Museum, who took charge of us and our belongings and quickly transferred us to the Hotel Geneve, where we made our home during our stay in the Mexican capital. The work of setting up the replica went rapidly forward, interrupted only by "Holy Week," which is universally observed in Mexico as a holiday. This replica, which is the ninth which has been presented to foreign countries, stands completed in the Museum, with the exception that the plate dedicating the gift to the Mexican people has not yet been installed, as will presently be done.

During our brief stay in Mexico we had opportunities to learn a great deal concerning the scientific work, which is being carried on by

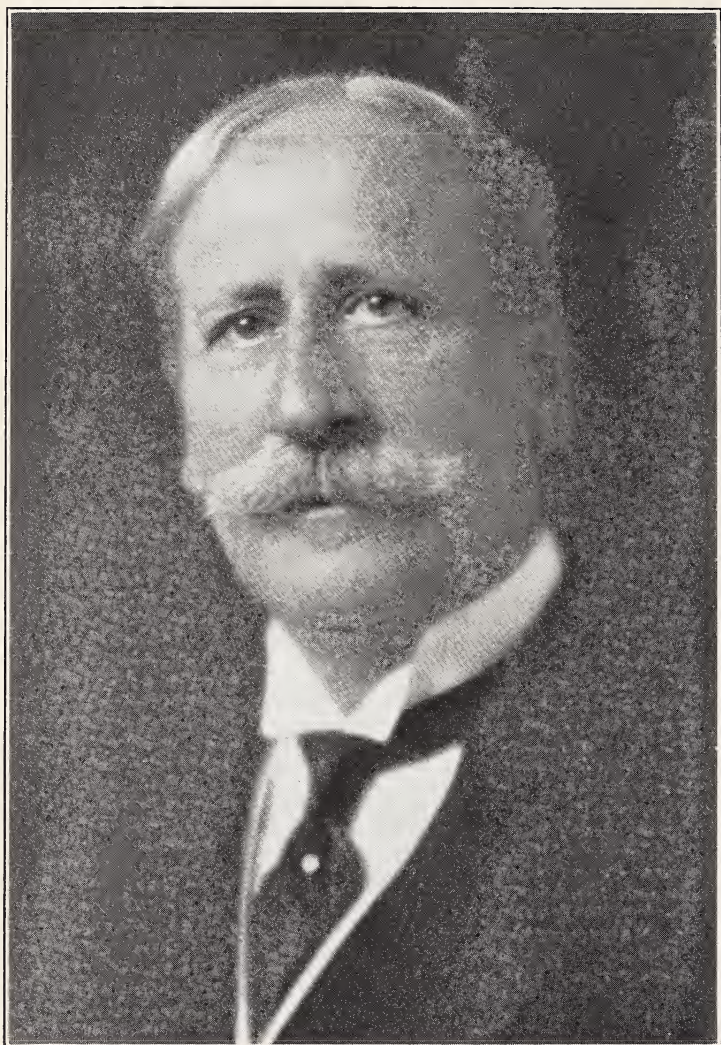
the University, various departments of the government, and especially by the Instituto de Biología, which is housed in the Casa del Lago and is the rallying-point for all advanced students of the biological sciences in our sister republic. The library of the Instituto de Biología is being brought into perfect order for purposes of consultation. It is rich in important works published in the past, many of which are now rare and difficult to acquire. It is not as rich in the literature of the present, but contains much that is of great value. It should be made the depository by the learned institutions and associations of the United States and Europe of their publications, which would thus become accessible to a large body of serious and capable investigators on Mexican soil. The Geological Survey of Mexico, which is under the administrative care of Sr. Dr. Salazar-Salinas, has a large and admirably arranged and catalogued library. The museum of this important institution is under the capable control of Dr. Federico K. G. Müllerried, who has been recently carrying on some very important researches, some of the results of which have just been published in the *Anales del Instituto de Biología*.

In the Departamento de Salubridad Publica much attention has been given to the investigation of matters relating to public health. Without entering into details, I may mention that in this department there have been set up several sections (*oficinas*), one of which is the *Oficina técnica de Investigaciones biológicas, etiológicas, y epidemiológicas*, in charge of which is Professor Carlos C. Hoffmann, a physician of high repute and an accomplished entomologist. Another section is known as the *Oficina para Defensa Agrícola*, at the head of which is Dr. Alfonso E. Dampf, who before the World War was in charge of entomological investigations in German East Africa, and who is a most expert entomologist, who has devoted himself especially to the economic aspects of the science. The laboratories of these *oficinas*, located in the Instituto de Higiene, are modern and new in all their appointments, and most admirable work is being accomplished in both of them, acting in unison with the Instituto de Biología. To the writer one of the most interesting investigations called to his attention was that relating to the recent discovery that Onchocercosis is communicated through a species of *Simulium* (*Dipteron*). A number of beautifully accurate researches upon the transmission of this frightful disease, which often results in blindness, have been recently carried on, and in the "*Anales*" of the Instituto de Biología, as well as elsewhere,

there have appeared papers written by Dr. C. C. Hoffmann and by Dr. I. Ochoterena in relation to the subject. The writer had the privilege of carefully studying the beautiful microscopic slides prepared by Dr. Ochoterena, revealing the filaria of *Onchocerca* imbedded in the tissues of the optic nerve and the membranes of the human eye.

Extensive and intensive studies upon the *Culicidæ* (mosquitoes) of Mexico, well known as transmitters of malarial disorders and yellow fever, are being vigorously prosecuted under the direction of the same group of learned men.

This rapid summary of our study of existing researches, all too brief, would not be complete without a reference to the fine work which has been done, and is being done, in the field of ethnological and archeological research. Under the tutelage of Dr. Ochoterena and a party of scientific friends an excursion was made to Teotihuacan. The manner in which the work of research has been carried on at this remarkable center of the ancient Aztec religious culture speaks volumes for its thoroughness and illuminating character. To justly delineate what has been accomplished in bringing to light the once neglected and half buried memorials of the past at this remarkable site would require more time and space than are at the command of the writer, who will never forget the Pyramids of the Sun and the Moon, the great temple enclosures and the teocalis of Teotihuacan. Scarcely less interesting are the treasures contained in the National Museum of Antiquities in the City of Mexico, where are preserved some of the choicest pieces, including the celebrated "Calendar Stone." Many replicas of these objects, thanks to the generosity of Mr. Carnegie, are on view in the Carnegie Museum. Mr. Carnegie on his own initiative had them made and presented them to this Museum many years ago.



HERBERT DUPUY

(Born May 10, 1856; Died January 10, 1930)

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OBITUARY

HERBERT DUPUY

The Carnegie Museum has lost the presence of one of its most faithful friends and benefactors through the death of Mr. Herbert DuPuy which occurred on January 10th, 1930. It is with a sense of deep personal bereavement that the Editor of the Annals records this sad event.

It was my privilege to form the acquaintance of Mr. DuPuy shortly after his arrival in Pittsburgh. For more than half a century we knew each other, and our acquaintance ripened into a close and intimate friendship. Shortly after his arrival in Pittsburgh he became a member of the Shakespeare Club, of the membership of which there survive today, so far as I can recall, but three persons, one of whom is Mrs. Herbert DuPuy, the others Mrs. William R. Thompson and the writer. On November 6th, 1879, he married Miss Amy Hostetter, daughter of the late Dr. David M. Hostetter, a well known physician and capitalist of Pittsburgh. Through long and happy years she was his faithful companion and actively cooperated with him in his works of benevolence. They possessed kindred tastes and a common purpose to do good. One of their crowning acts of kindness was the presentation to the Carnegie Museum of their large and valuable collection of works of art, in amassing which they had expended over half a million of dollars.

Mr. DuPuy was of Huguenot ancestry, belonging to a family of *émigrés*, who ultimately made their home in Philadelphia in the latter part of the Eighteenth Century. He was born in Chicago, on May 10, 1856. His father, the late Charles M. DuPuy, was at that time temporarily resident in Chicago, acting as General Manager of the road, which has since come to be known as the Illinois Central Railway. In 1864 the family returned to Philadelphia, their ancestral home.

Herbert DuPuy received his early education in Philadelphia and graduated in 1878 at Lehigh University as a metallurgical chemist. He at once came to Pittsburgh, finding employment as the chemist at the Lucy Furnace. Here he succeeded, where others had failed, in utilizing to great advantage "roll scale," which manufacturers of

iron and steel before that time had regarded as intractable material, therefore consigned to the dump, although richer in iron than the ores which they were using. DuPuy's success won the applause of Andrew Carnegie, who alludes to the matter in his *Autobiography*, and always claimed DuPuy as one of his "boys."

Shortly after his marriage Mr. DuPuy embarked with David Shaw and Robert J. Anderson in the construction at McKees Rocks of a plant for manufacturing crucible steel, which they operated until 1900, when it was absorbed by the Crucible Steel Company of America. Meanwhile he secured control of large tracts of coal-lands which he successfully developed and subsequently sold. He served as a Director of the Pittsburgh and Lake Erie Railroad, of the Farmers Deposit National Bank, of the Monongahela Bridge Company, of which he was Vice-President and General Manager. It was under his supervision that the present steel bridge at Smithfield Street was substituted for the suspension bridge which spanned the Monongahela River at that point. He took up operations in real estate and built in the year 1890 more than one hundred and thirty houses in the City of Allegheny, which he successfully sold. He gradually acquired large holdings of real estate both in Pittsburgh and in New York City, where he was reputed to be one of the largest holders of frontage on Broadway. When the Crucible Steel Company of America was organized he took an active part in its development, becoming President, and, on the death of Mr. William G. Park, the Chairman of the Board. The Company at that time was laboring under financial difficulties, from which Mr. DuPuy succeeded triumphantly in extricating it, placing the Company upon a sure foundation. Later he established the Pennsylvania Rubber Company at Jeannette, Pa., placing two of his sons in charge of the same. The death of the sons after the World War compelled him to resume the general oversight of the latter enterprise. Mr. DuPuy was far-seeing, energetic, and possessed until nearly the end of his life of a magnificent physique and indomitable energy. In whatsoever he undertook he prospered.

Mr. DuPuy was public-spirited and generous in his contributions to good causes. For seventeen years he served as a Trustee of the Carnegie Institute, during all that period being a member of the Committee in charge of the Museum and during a few of the later years being also a member of the Committee in charge of the Department of Fine Arts. Many years ago he began gradually to transfer to the

Museum collections which he had been making both in this country and in Europe, representing those branches of art in which he had become a connoisseur. Finally in the year 1927 he announced his intention of giving his entire collection to the people of Pittsburgh, placing it in the custody of the Department of the Museum. One of the most important and historically interesting parts of this great and varied assemblage of works of art is that which is composed of miniatures, in which the leading miniature painters of the last four centuries are represented, in many cases by portraits of historically famous personages, among them Oliver Cromwell and Napoleon Bonaparte. This is said to be, with one exception, the largest and most perfect collection of miniatures in existence in the New World. The arts of the silversmith and the jeweler, the carver in wood, the modeler in wax, and the maker of illuminations on vellum, are splendidly illustrated.

Mr. DuPuy took a deep interest in the affairs of the Episcopal Church of which he was a member, many of the annual conventions of which he attended as a delegate from the Diocese of Pittsburgh. He contributed generously to all appeals for assistance on behalf of the various hospitals and charities of the city in which he made his home. In 1927 he gave to Yale University two funds in memory of Wilfred and Charles M. DuPuy, his sons, to aid self-supporting students who are struggling to make their way through that institution.

Mr. DuPuy had many friends on the other side of the Atlantic. An aunt was the wife of the late Sir Richard C. Jebb, the famous Professor of Greek at Cambridge University in England, one of the most famous scholars of his time. Lady Jebb still survives, and is at present residing in this country. His sister, Miss Maud DuPuy, was the wife of Sir George P. Darwin, the second son of Charles R. Darwin. For many years he was Professor of Astronomy and higher mathematics at Cambridge University. She survives her husband, who passed away loaded with honors, Dec. 12, 1912. Mr. DuPuy also had friends in France, the land of his paternal ancestors, among them the late Baron d'Estournelles de Constant. For years Mr. DuPuy was the Vice-President of the Huguenot Society of America.

We who knew him best will ever mourn his absence from the Museum, which he loved and which, as his good wife said to me recently, 'absorbed his thought more than anything else, except his business affairs.'



DANIEL WINTERS.
(Born Feb. 4, 1876; died May 8, 1930)

OBITUARY

DANIEL WINTERS

Among those who have faithfully served the people of Pittsburgh in official stations the name of Daniel Winters must be mentioned with honor. As a member of the Council of Pittsburgh he acted as a Trustee of the Carnegie Institute from 1919 to 1929, serving in all that time as a member of the Committee in charge of the Carnegie Museum. He was faithful in his attendance upon meetings and intelligent in dealing with the problems which necessarily arose for discussion from time to time. While not claiming to possess technical knowledge, he had the rare qualification of good "common sense," which is often better in administrative counsels than profound learning as a specialist. He also understood "human nature," and at times that is a fine qualification for office.

Daniel Winters was born at 155 South Sixteenth Street, Pittsburgh, on February 4, 1876. He was the son of the late Daniel and Elizabeth (Davis) Winters. He was educated in the Birmingham Public School. When but a lad he went to work for the S. McKee Glass Company being advanced from one position to another. He was active in the organization of glassworkers becoming the Secretary of the national body in 1903 and in 1904 its President. From 1905 to 1908 he was Superintendent in the cutting department of the New Martinsville Window Glass Company of West Virginia. Returning to Pittsburgh he was for a year employed in the service of the United States Mail. In 1909 he was appointed Police Magistrate by Mayor Magee and for five years discharged the duties of that office with acceptance. In 1914 he held office for a short while under the Sheriff of Allegheny County as a clerk and then was appointed by Mayor E. V. Babcock, Assistant Director of Public Safety. In 1918 he was elected to fill a vacancy in the Council of the City of Pittsburgh, of which he presently became the President, and in which station he remained until in the fall of the year 1929 he was elected to the office of City Controller. He held many positions of trust and responsibility in fraternal orders with which he was connected and enjoyed wide popularity as a ready and witty speaker on public occasions. His faithful services as

a Trustee of the Carnegie Institute representing the Council of the City of Pittsburgh will be long held in grateful remembrance.

Mr. Winters died on the evening of May 8th, 1930, in the Cunningham Sanitarium at Cleveland, to which he had gone in the hope of recovering from a complication of physical disorders. His only son survives him.



JAMES DICKEY HAILMAN.
(Born March 12, 1866; died June 7, 1930.)

OBITUARY

JAMES DICKEY HAILMAN

Mr. James Dickey Hailman was born on March 12, 1866, in Pittsburgh in the old family mansion, which for many years has been known as the Hotel Kenmawr. His father was the late George W. Hailman, who had succeeded his father, James W. Hailman, who was one of the early manufacturers of steel products in Pittsburgh. Mr. Hailman's mother was the daughter of Mr. Robert Dickey, a well known merchant, belonging to one of the old families of the city.

In his boyhood James D. Hailman attended the public schools of Pittsburgh and later spent some time at Holbrook Military Academy at Ossining, N. Y. Later he studied in Pittsburgh at the Newell Institute, in its day a well known preparatory school. He matriculated at Rensselaer Polytechnic Institute at Troy, N. Y., in 1884, graduating with honors in 1887 taking the degree of C.E.

After graduation he did not follow his profession, but found employment in the firm of Robert Dickey and Co. He soon became the Secretary and Treasurer of the newly organized Morris and Bailey Steel Company, of which he was one of the partners.

On October 7, 1896, he married Miss Johanna Knowles Woodwell, the only surviving child of Mr. and Mrs. Joseph R. Woodwell, a well known artist and merchant, who was one of the first Trustees of the Carnegie Institute appointed by Mr. Carnegie.

After spending over a decade in active business pursuits, Mr. Hailman withdrew, disposing of part of his interest in the Morris and Bailey Steel Co. to his partners, who in recent years have surrendered its control to the United States Steel Corporation.

After retiring from business Mr. Hailman gave himself up to promoting various philanthropic causes which appealed to him. He was one of the Trustees of the Western Pennsylvania Hospital, to the planning and erection of the new buildings of which he devoted a great deal of time and attention. He was one of the original members and secretary of the voluntary organization known as the Citizens Committee on City Plan, and later became a member of the City Planning Commission, the official body, which has done much in recent years to bring

about the beautifying of the city and the rearrangement of its thoroughfares. He was for several years President of the Civic Club, an organization which has labored strenuously to bring about better social conditions in various parts of the city through the enactment of legislation and by promoting the establishment of playgrounds, public baths, and similar enterprises. He was one of the Directors of the Pittsburgh Association for the Improvement of the Poor, and did much on behalf of this long established and useful organization, taking especial interest in the construction of the recently completed Washington Street Building, where shelter and employment are given to the needy. He was for many years, up until the time of his death, a member of the Board of Education of the City of Pittsburgh, and was active in promoting the movement which led ultimately to the erection of the present building occupied by the Board at the corner of Forbes and Bellefield Avenues. He took an interest in the work of the organization known as the One Hundred Friends of Pittsburgh Art.

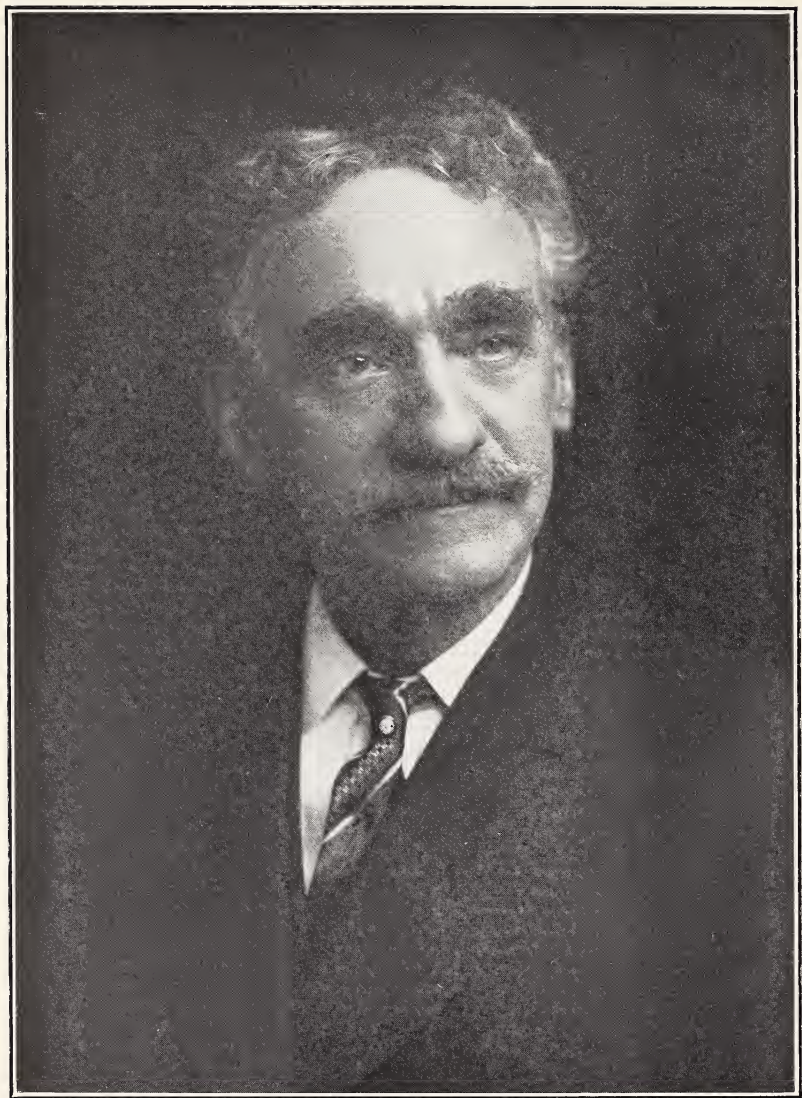
In 1915 Mr. Hailman was elected a member of the Board of Trustees of the Carnegie Library of Pittsburgh and *ex-officio* became a member of the Board of Trustees of the Carnegie Institute. He faithfully served on various committees of the Library and for many years was a member of the committee in charge of the Department of Fine Arts in the Institute.

In all the multifarious activities in which he was engaged he was characterized by promptitude and diligence. He was most punctilious in keeping his engagements, and, whoever else might be absent at the meetings of boards and committees, he was sure, unless prevented by illness or absence from the city, to be in attendance.

Mr. Hailman was not interested, as many are, in athletic sports and recreations. He devoted much of his leisure to reading and was especially interested in books dealing with the progress of scientific research. He was fond of travel. Prior to the World War, accompanied by his wife, he made a number of visits to Europe. In more recent years he generally spent the colder months of the winter in Bermuda, Nassau, and southern Florida. He was of a sunny and cheerful disposition, devoted to his family and friends, given to hospitality, and in his beautiful home was the center of a circle, who always found delight in his company. During the last two years of his life he suffered from illness, but on his return in the spring of the year 1930 he felt that he had entirely regained his customary vigor.

With cheerfulness and alacrity he resumed his round of duties, assuring his friends that he felt better than he had for many years. The end came suddenly. After spending the evening at home, in the company of friends, he retired to his room, but presently called to his wife, telling her that he was in great pain. Almost before a physician could be summoned, he passed away, dying of heart-failure, shortly after midnight on June 7, 1930.

All the best years of his life were given without recompense, save that of a good conscience, to the service of the people of this great city. He set a shining example to men of wealth and leisure as to the way in which they may make their years useful and beautiful.



JOSIAH COHEN.
(Born November 29, 1841; died June 11, 1930)

OBITUARY

HON. JOSIAH COHEN

Josiah Cohen was born on November 29th, 1841, in Plymouth, England, a son of Henry and Rose Cohen. His family for many generations had lived in Cornwall. His boyhood was spent in Falmouth and London. After studying with private tutors he entered the Institute of Jewish Education in London, where he made rapid advancement. In 1857, when he was sixteen years of age, the family removed to America. He later came to Pittsburgh. He became an active worker in the Rodef Shalom Congregation, teaching English, acting as a minister, and interpreting such sermons of the venerable Rabbi L. Naumburg, which were delivered in German, to the English-speaking members of the congregation. He became a friend of Professor Andrew Burt, through whose influence he became a member of the Allegheny County Teachers Association, of which for a time he was the presiding officer. He studied law in the office of John M. Kirkpatrick, and Judge Thomas Mellon, and in 1866 was admitted to the Bar of Allegheny County. On January 22, 1868, he married Miss Carrie Naumburg, the daughter of his good friend, the venerable Rabbi. He practiced his profession with success for many years, meanwhile taking an active interest in politics, and educational matters. From 1873 to 1876 he was a member of the Central School Board of Pittsburgh. In 1881 he was chosen a presidential elector, casting his vote for James G. Blaine. In December, 1901, he was appointed a Judge of the Orphans Court of Allegheny County. In 1903 he resumed the practice of law, but in 1907 was appointed a Judge of Common Pleas Court No. 4, which had been called into being, and in the same year was elected for a ten-year term in that court. In 1917 he was re-elected by a huge majority for another ten-year term, and again re-elected in 1928 to the same position. His service as a judge of the courts of Allegheny County covered nearly thirty years.

He was active in all good works and prominent in all of the Jewish philanthropies of the city in which he lived, and of the nation. For many years he was the vice-president and since 1910 the president of the Rodef Shalom Congregation.

He and his wife, whose musical talent won her wide recognition, spent many summers at Cresson, Pa., and there they became well acquainted with Mr. Andrew Carnegie, who now and then beguiled the summer afternoons by inviting her to give recitals upon the piano at his cottage. When Mr. Carnegie came to appoint the Trustees of the Carnegie Institute, his choice naturally fell upon his friend Cohen, as one who would ably represent in that board the Jewish people, and he was accordingly named by Mr. Carnegie as a member of the Board. He served for thirty-three years in this capacity, from 1897 until the day of his death. He was a member of the Committee upon the Museum from 1897 to 1901, and from 1902 onward served continuously as a member of the Committee upon the Fine Arts.

Judge Cohen lived to "length of days." He was in his ninetieth year, when he "fell on sleep and was laid away unto his fathers," honored and beloved in the great community, which he had faithfully served from his youth. He was at the time of his departure the senior judge in the Commonwealth of Pennsylvania, and it is alleged that he was the oldest jurist in active service on the bench in the United States. The end came suddenly. He died on June 11, 1930.

OBITUARY

DR. WILLIAM BARNES

The death of Dr. William Barnes of Decatur, Illinois, on May 1, 1930, ended the career of one of the most enthusiastic and diligent students of entomology in this country. He specialized as a lepidopterist, and amassed one of the largest and most beautiful collections of the butterflies and moths of the United States and Canada, which is in existence. He spared neither effort nor money in building up this collection. At various times he employed as curators Dr. James H. McDunnough, now of the Department of Agriculture in Ottawa, Canada, and Editor of *The Canadian Entomologist*; Dr. A. W. Lindsey, now Professor of Zoölogy in Denison University, Granville, Ohio; and Mr. Foster H. Benjamin, who at present is in the employment of the United States Bureau of Entomology in Florida. With the help of these and other specialists he began the publication at irregular intervals of a serial entitled *Contributions to the Natural History of North American Lepidoptera*, of which four complete volumes have appeared, and parts of the fifth. He and his associates named and described a large number of species and varieties of lepidoptera new to science. Especial attention from the outset was given to the lepidopterous fauna of the western and especially the southwestern states. Recently, when the great collection of lepidoptera, which had been amassed by the late Charles Oberthür of Rennes, France, was broken up and sold, Dr. Barnes purchased among other things those parts of Dr. Boisduval's collection of Californian butterflies, which had come into the possession of Oberthür after the death of Boisduval. Dr. Barnes rendered a distinct service to American lepidopterists, in making these accessible to cis-Atlantic students, without having to journey to France. He spent much time, when his professional duties permitted, in personally exploring the region of the Rocky Mountains and especially Arizona in quest of lepidoptera, and also maintained for a long time a number of capable collectors in these parts.

Dr. Barnes' work as an entomologist has won for him a secure place in the annals of science. He was, however, far more than an entomologist. In the state of Illinois he was regarded as one of the fore-

most surgeons of his generation. As the Founder of the Decatur and Macon County Hospital, located at Decatur, Ill., his name is held in reverent affection by the community in which he lived and served; as the Founder and genial President of the Decatur Country Club he endeared himself to a host of friends.

Dr. Barnes was born at Decatur, Ill., September 3, 1860. His early education was received in the schools of that city, where he graduated with honors from the High School in 1877. In 1878 he attended the Illinois State Normal School; the following year he was a student at the University of Illinois. In 1879 he entered Harvard, where he took the degree of Bachelor of Science after a four years' course, standing at the head of his class. He graduated from the Harvard Medical School in 1886, and, after serving an internship in Boston, undertook postgraduate studies at Heidelberg, Munich, and Vienna. On June 20, 1890, he married Miss Charlotte Gillette of Elkhart, Ill. He is survived by a son, William A. Barnes, Jr., and a daughter, Mrs. Selim McArthur, of Chicago, Ill.

For forty years the Editor of these Annals has corresponded with and known Dr. Barnes, to whom he is indebted for many great kindnesses in correspondence and in exchange. His last act of kindness was to send me the types of a number of species recently described by him, so that colored figures of these may be shown on the plates of the new edition of *The Butterfly Book*, which is being prepared.

XVI. THE MAMMALIAN FAUNA OF PENNSYLVANIA.

By SAMUEL H. WILLIAMS.

(PLATE XIV)

The first attempt to make a systematic survey of the mammalian fauna of Pennsylvania was made by Samuel N. Rhoads, Esq., of Philadelphia, who in 1903 privately published the results of his investigations under the title "The Mammals of Pennsylvania and New Jersey." Rhoads did his work thoroughly and capably and his paper still stands as the basis of our knowledge of the geographical distribution of species within the confines of the state of Pennsylvania.¹

In 1897 there was published by the State of Pennsylvania a document by Dr. B. H. Warren entitled, "Diseases and Enemies of Poultry," which included accounts of various predaceous mammals known to exist in the state. Although many interesting notes concerning the occurrence of various species were included, there was no attempt to establish the distributional ranges of the various species mentioned.

Several local lists have been made and included in County Histories and other local publications. Among the most reliable of these was "A List of The Mammals of Beaver County" by W. E. C. Todd in Bausman's "History of Beaver County, Pennsylvania," published in 1904.

In its primeval state Pennsylvania was rich in animal life. Many of the forms, which roamed "Penn's Woods," have there become extinct. Among these are the Bison, the Cougar, or Mountain-Lion, and the Wolf. Other forms have been so reduced in numbers that without protective measures their extermination is inevitable.

There is no doubt that the mammals of the world have reached the peak of their development as far as size is concerned. Those animals, which persist, will, in all probability, be reduced in size. The spread of so-called civilization will result in the extermination of the larger

¹At the present time the Pennsylvania Game Commission is recording localities of all animals on which bounties are paid. Within a few years these records should serve as an excellent source of information as to the general distribution of such species. The numbers of each species on which bounties are paid will serve to indicate the relative abundance of the various predatory mammals.

mammals and the time is not far distant when they will be "of the past." In all probability, future generations will look with awe upon the towering forms of giraffes, elephants, and even smaller forms, such as the horse, solely preserved in the galleries of our museums.

Within a few decades we have witnessed a great reduction in number of the wild animals on our American plains and in the interior of Africa and South America. Fear is being expressed for the possibility of the extermination of the Gorilla. The whaling industry, the sealing industry, and the fur-business in general, have been greatly reduced in their proportions. While the demand for furs is still great, the supply is rapidly becoming limited. It even may be doubted whether in this age of mechanical advance breeding will sustain the numbers of some of the larger mammals. Horse-racing, as a sport, may succumb, before the ever increasing mania for speed. The horse is being replaced by automobiles and aeroplanes. From the standpoint of experimental genetics we have no reason to believe that the larger animals will continue as subjects for study, because of their long periods of gestation and because of the impracticability of maintaining them. The tendency is to use minute forms, such as fruit-flies and parasitic wasps, numerous generations of which may be secured in a short space of time, and kept for observation.

The extermination of larger animals will, naturally disturb the balance of nature, and it may require the passing of many years before conditions eventually become stabilized. When equilibrium is again restored and new interdependencies have been established, the resulting fauna will be reduced in the number of species, and in size. Arboreal forms will be few. There will be a paucity of large cursorial forms; the smaller subterranean animals, being the more secure, will be the most abundant.

The faunal history of Pennsylvania has already demonstrated such tendencies. Not many years ago such animals as the deer and the bear were so scarce, so that, when an individual of either species was seen, it was of sufficient interest to call for mention in the newspapers. The increase of these animals in the past few years is due entirely to restocking, the acquisition of lands by the state, and the rigid enforcement of protective measures put into effect at the suggestion of the State Game Commission.

While the larger animals were being decimated in years gone by, little attention was paid to a multitude of smaller forms, such as

shrews, mice, weasels, etc. These lesser kinds have thus far apparently been able to maintain themselves in considerable number, in the face of their being crowded into ever narrowing limits.

At the present time there are at least sixty-three species of mammals indigenous to the commonwealth of Pennsylvania. These include one marsupial, the opossum; three moles; five shrews; nine bats; one bear; one raccoon; three weasels; probably two minks, although one is doubtful; one skunk; one otter; two foxes; one wildcat; one deer; and thirty-two rodents. The rodents are the Woodchuck, or Groundhog; two species of Chipmunks; two Red Squirrels; two Fox Squirrels; two Flying Squirrels; two Gray Squirrels; one species of Beaver; four species of Deer-mice; one Cave-rat; one Red-backed Mouse; one Lemming-mouse; one Mole-mouse; one Meadow-mouse; the Muskrat; three species of Jumping Mice; the Black Rat; the Brown (Norway) Rat; the House Mouse; the Porcupine; two species of Rabbits; and one Hare.

The above list includes several exotic species, which have become so general, as to warrant inclusion in the native fauna; while a few introduced species, which are as yet rather limited in numbers and distribution, have been excluded. In the list are several species, which have always been rare, or have not been found in numbers by collectors. Among these are the Marsh-shrew (*Neosorex albibarbis*), a northern species which has been found only in the northeastern part of the state in the Pocono Mountains; the Roof-rat (*Rattus alexandrinus*), an exotic species introduced from Alexandria, Egypt, which probably could not cope with the Norway Rat; and the Woodland Jumping Mouse (*Napæozapus insignis insignis*).

Some mammals, such as Beavers, Fox-squirrels, and Least Weasels, which have been considered more or less uncommon, are increasing in numbers. The Beaver, under rigidly enforced protection, is rapidly recovering its former numbers. There are at least eighteen colonies of beavers within the confines of the state.

On the other hand, the Otter, Mink, and Marten are decreasing in numbers and it is not improbable that the latter has been completely exterminated. The persistence of certain forms is remarkable. The Bob-cat (*Lynx rufus*), which has been persecuted for generations, still abounds; bounties on almost two thousand specimens have been paid in the last five years. The Canadian Bob-cat (*Lynx canadensis*), while never abundant, seems to have completely disappeared from Penn-

sylvania with the Cougar or Mountain-lion. Foxes, with their proverbial cunning, have held their own, although their destruction is encouraged by the State.

Fur-hunters have considerably reduced the numbers of several species, while others are being destroyed for economic reasons, bounties being paid to stimulate their reduction. It is remarkable that the raccoon can persist in face of the demand for "Coon-skin coats."

While the necessity for keeping down the numbers of certain predaceous mammals, which feed upon game-birds and smaller game-mammals, is recognized, the complete extermination of any animal is a risky procedure. As has already been indicated, the removal of any form upsets the balance of nature. Forms, for the protection of which a ruthless war is waged against their enemies, in the absence of the latter frequently multiply so rapidly, that they themselves threaten even greater destruction, and become pests.

While it is true that the weasel is an enemy of quail, pheasants, and rabbits, it should not be forgotten that rats and mice also form a large part of its diet. Its short legs and serpentine body adapt it well to gaining access to the subterranean burrows of rodents, and its complete extermination would undoubtedly remove one of the effective checks against these destructive animals. Hunters do not concern themselves with the eradication of the small rodents, which are well protected by their size, color, and ability to dart into underground shelters. To ignore these and at the same time kill off the predaceous forms, which feed upon them, may prove to be costly.

The recent protests against the killing of does in Pennsylvania were unjustified. It seems always best to accept the judgment of those individuals who constitute the Game Commission, because they are vitally concerned with the problems of conservation and they employ a staff of well trained men, who constantly study the animal problem in all of its aspects. Our limited ranges can support only a proportionate number of deer. Under protection the animals can reproduce with amazing rapidity. When the numbers become too great they are faced with a shortage of food and numbers of them die of starvation in severe winters. In the struggle for existence their feeding becomes so extensive that all the lower sheltering shrubs are devoured. Upon these plants many game birds and smaller mammals depend for shelter. The removal of these "cover" plants is disastrous to the smaller forms, and even to the deer. This has been remarkably

demonstrated in the case of the deer on some of our western forest reservations, who literally ate themselves "out of house and home," and died of starvation.

The distribution of the mammals of Pennsylvania at the present time is to some extent a matter of conjecture, because of the lack of sufficient recent "records." The evidence at hand shows a decided modification of ranges within the past twenty-seven years, since Rhoads conducted his investigations. The establishment of a complete and intricate highway system, which reaches virtually every part of the state, and the introduction of certain species, combined with a gradual crowding of wild creatures into limited areas, have considerably altered the former distribution. Some woodland forms have had their ranges limited by the deforestation of vast areas and many of them are confined to restricted quarters because of wide unforested interspaces, which serve as barriers to migration. The struggle for existence in some of these regions is bitter, while on the other hand, the limitation of areas has caused an emigration of enemies which could not survive in such reduced foraging districts. Consequently the existing species have more favorable auspices for survival and multiplication.

The pollution of streams has contributed greatly to the reduction of aquatic and semi-aquatic mammals. The reduction of feeding grounds always has this effect, and when animals become scarce, there will naturally be a lessening of the numbers which prey upon them.

In considering the matter of geographical distribution within this Commonwealth there are numerous factors to be considered: (1) The adaptability of various mammals for migration; (2) the suitability of habitats; (3) the natural barriers and highways of dissemination and the effects of human activities on these barriers and highways; and (4) climatic zones.

Certain mammals are so well adapted to migration that they inhabit wide ranges and their ability to move from unfavorable situations enable them to survive variable conditions. Naturally the distribution of such species will fluctuate from time to time, but even such mammals as bats, which are admirably adapted to extensive migration, find their activity limited by barriers such as mountains, the crossing of which they may find difficult.

Many mammals are structurally modified for specific habitats.

We have arboreal, terrestrial, aquatic, and aerial forms. These structural adaptations limit some of these kinds to certain districts. Deforestation, agriculture, and drainage naturally in these cases reduce the number of favorable habitats. Forms which are specialized necessarily are restricted to regions where conditions are suitable for their life, and, when these change, they migrate, or perish.

There are three distinct Life-zones in Pennsylvania. These zones cannot be defined in terms of latitude and longitude. The zonation of the fauna of Pennsylvania is largely isothermal, and in consequence is determined along communicating lines, which depend more or less upon temperature fixed by relative elevation.

The Canadian Zone is the most northerly and extends into Warren, Forest, Jefferson, McKean, Elk, Clearfield, Potter, Cameron, Clinton, Tioga, Lycoming, Sullivan, Bradford, Susquehanna, Wyoming, Lackawanna, Wayne, and Pike Counties. It also includes parts of Erie, Clarion, and Indiana Counties and stretches along the Allegheny Mountains into Fayette, Westmoreland, and Somerset Counties. The Northern part of Cambria and some sections of Blair, Bedford, and Center Counties are also included in the Canadian Zone.

Within the Canadian zone are those mammals which are northern in their ranges. The Varying Hare or "Snow-shoe Rabbit" (*Lepus americanus virginianus*), the Marten (*Mustela americana americana*), the Least Weasel (*Mustela allegheniensis*), the Cave-rat (*Neotoma pennsylvanica*), the Woodland Jumping Mouse (*Napæozapus insignis insignis*), the Northern Pine Squirrel (*Sciurus hudsonicus hudsonicus*), the Northern Gray Squirrel (*Sciurus leucotis caroliniensis*), the Beaver (*Castor canadensis*), the Canadian Deer-mouse (*Peromyscus canadensis*), the Red-backed Mouse (*Eutamias gapperi gapperi*), the Meadow Jumping-mouse (*Zapus hudsonicus hudsonicus*), the Porcupine (*Erethizon dorsatum dorsatum*), the Otter (*Lutra canadensis*), the Mink (*Mustela vison vison*), Bonaparte's Weasel (*Mustela cicognanii cicognanii*), the Smoky Shrew (*Sorex fumeus fumeus*), the Marsh Shrew (*Neosorex albibarbis*), the Hairy-tailed Mole (*Parascalops breweri*), the Hoary Bat (*Lasionycteris noctivagans*) are common to the Canadian Zone, and occur in the finger-like extensions of this zone which thrust themselves southward.

The Transition (Hudsonian) Zone in Pennsylvania is very irregular, because of the peculiar topography of the State.

The Austral (Carolinian) Zone is represented by northward pro-

jections dovetailing into the Canadian, which is confined to the higher massifs of the region. Intermediate between the finger-like northward projections of the Carolinian and the southward finger-like projections of the Canadian are intercalated territories of moderate elevation above sea-level, which sometimes are narrow, sometimes broad, representing the Hudsonian, in which there is a commingling of northern and southern forms. As our map shows, the Transition Zone occupies a large part of the northwestern area of the state, the valleys between the great uplifts of the Appalachians and the mountainous parts of the eastern end of the state. In the region of the mountains the Transition Zone is frequently well defined. It includes most of Erie County, Crawford, Mercer, Lawrence, Venango, Butler, Beaver, Armstrong, Clarion, Indiana, and a small part of Allegheny. The Laurel and Chestnut Ridges of the mountains in Fayette and Westmoreland counties are questionable, but undoubtedly lie chiefly in this zone. The sections of Cambria and Somerset between the mountain ridges and also parts of Blair, Bedford, Center, Fulton, Huntingdon, Mifflin, Franklin, Juniata, Snyder, Union, Montour, Northumberland, Columbia, Luzerne, Schuylkill, Lebanon, Lehigh, Monroe, and a part of Berks, where the branches of the Susquehanna River flow from the north, are all within the Transition Zone.

Within the Transition Zone exist the scattered forms of both the Canadian and Carolinian Zones. The more southerly forms not infrequently occur on the lower edge of the Canadian Zone and certain northern species extend, occasionally to the Austral Zone.

The Austral (Carolinian) Zone comprises the southwestern counties of Greene, Washington, Fayette, Westmoreland, Allegheny, Beaver, and the southeastern counties of Lancaster, Chester, Philadelphia, Cumberland, York, Montgomery, Adams, and Bucks. There is an evident, progressive northward migration of both plants and animals in the Susquehanna valley.

The Opossum (*Didelphis virginiana virginiana*), Southern Gray Squirrel (*Sciurus carolinensis*), Rafinesque's Deer-mouse (*Peromyscus leucopus leucopus*) Barton's Jumping-mouse (*Zapus hudsonius americanus*), Lowland Cotton-tail Rabbit (*Sylvilagus floridanus mearnsii*), Mole-shrew (*Cryptotis parva*), Georgia Pygmy Bat (*Pipistrellus subflavus subflavus*), and Rafinesque's Little Brown Bat (*Nycticeius humeralis*), are all characteristic of the Austral (Carolinian) Zone.

The Raccoon (*Procyon lotor lotor*) and the other species mentioned in the recent work of the writer² may be found, generally in the Transition Zone and in the lower Canadian and Upper Austral Zones.

Because of the irregularity of contour of the life-zones we see in Pennsylvania a rather unique distribution of mammals. Where species overlap or graduate into one another (especially in the case of certain mice), the often flimsy bases of subspecification make it difficult to discriminate among them.

Concerning the biology and distribution of Pennsylvanian mammals there is much to be learned. Records from every part of the state are needed and specimens of rats, mice, shrews, bats, flying squirrels, and moles with complete data should be secured from every section. Without these records a thorough knowledge of geographical distribution cannot be ascertained.

The distributional records herein given have been culled from field-notes made by the writer for many years, and from the records of the Pennsylvania State Game Commission, as well as from other sources.

Data concerning the feeding and nesting habits of shrews and information about the migrations of bats, are particularly needed, because of all native mammals these are the least known. However, the present knowledge of our native fauna shows conclusively that Pennsylvania has within its boundaries a remarkable variety of mammalian forms.

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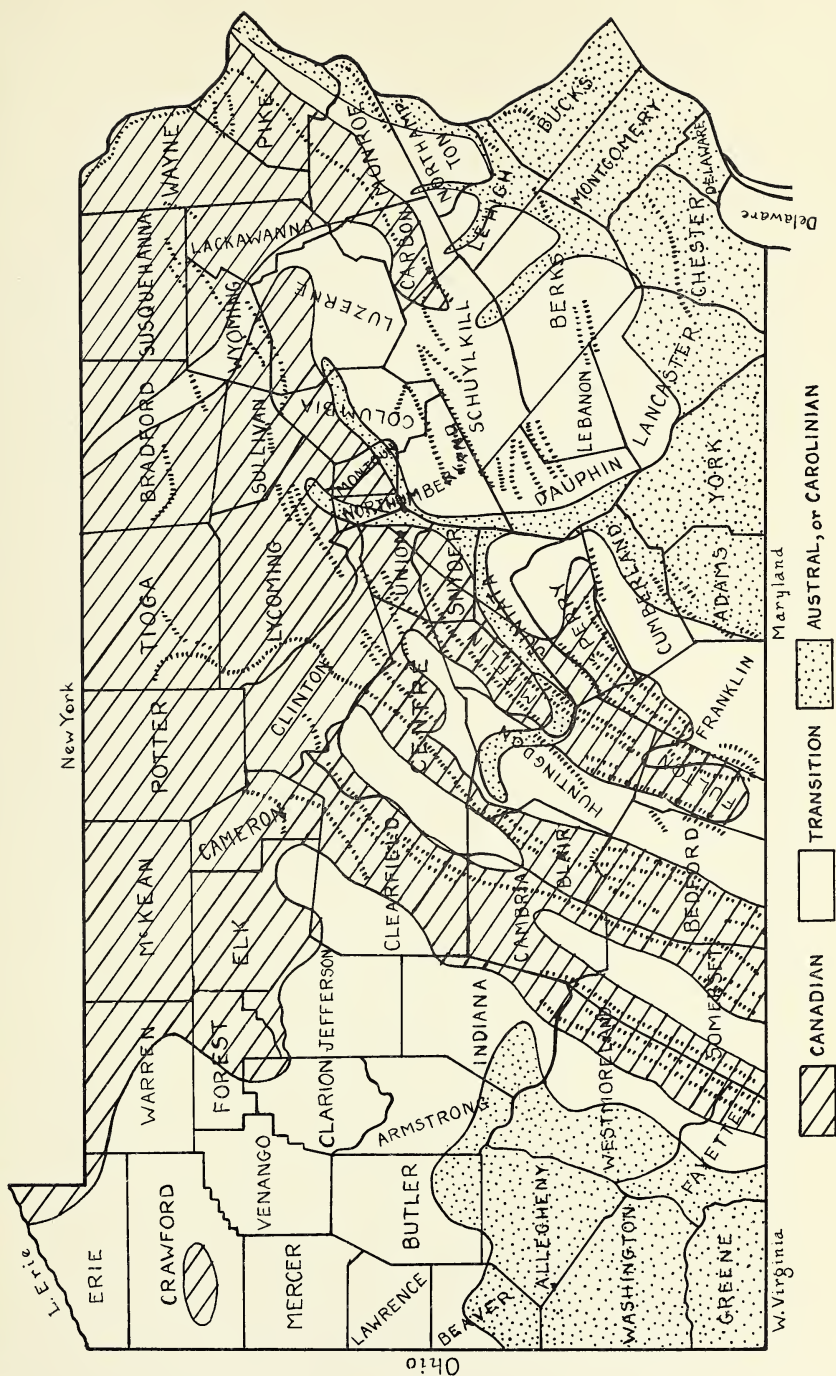
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²Williams, Samuel H.—The Mammals of Pennsylvania, U. of P. Press, 1928.

EXPLANATION OF PLATE XIV,
FAUNAL MAP OF PENNSYLVANIA.

The map shows the distribution of life-zones in Pennsylvania. The Pymatuning Swamp in Crawford County constitutes an island of the Canadian Zone, which is gradually becoming smaller through deforesting and draining. The isolation of this area is evidently due to the gradual northward migration of southern forms, which have slowly surrounded the swamp, thus separating it from the rest of the Canadian. This swamp has recently been closely studied by various investigators. (See Sutton, "The Birds of Pymatuning Swamp and Conneaut Lake, Crawford County, Pa." Ann. Carn. Mus., Vol. XVIII, 1928, pp. 19-239).

The valleys of the Susquehanna, Schuylkill, and Delaware rivers are proving to be excellent highways for the northward migration of many plants, and their associated faunæ. Dr. Otto E. Jennings states that the River Birch (*Betula nigra*) and the Persimmon (*Diospyros virginiana*) have ascended the valley of the Juniata and its branches; the mammalian records indicate that these plants have followed the paths of animal forms. The map shows finger-like extensions of the Austral or Carolinian Zone through Juniata, Mifflin, Huntingdon, and even Blair Counties. The branches of the Schuylkill indicate a similar progression.



XVII. NOTES ON SOME SOUTH AMERICAN
GERRIDÆ (HEMIPTERA).

BY C. J. DRAKE and H. M. HARRIS.

Through the kindness of Dr. W. J. Holland, Director Emeritus of the Carnegie Museum, the writers have been permitted to study a small collection of water-striders from Brazil, Paraguay, and Bolivia, South America. The collection is represented by nine species, two of which are new to science and described below.

Genus GERRIS Fabricius, 1794.

Gerris FABRICIUS, Ent. Syst., IV, 1794, p. 187.

Limnotrechus STÅL, Öfv. Vet.-Ak. Förh., XXV, 1868, p. 395.

1. *Gerris marginatus* Say.

Gerris marginatus SAY, Heter. N. Harm., 1832, p. 36; (Fitch reprint, p. 807; compl. writings, I, 1859, p. 362); Drake and Harris, Ohio Journ. Sci., XXVIII, 1929, p. 271.

Male and female, Pará, Brazil. These two macropterous specimens seem to differ in no appreciable way from numerous specimens of *G. marginatus* from the United States and Canada. Not heretofore recorded from South America.

Genus TENAGOGONUS Stål, 1853.

Tenagogonus STÅL, Öfv. Vet.-Ak. Förh., X, 1853, p. 263 (*nomen nudum*); STÅL, *ibid.*, XII, 1855, p. 45.

Limnometra, Mayr, Verh. Zool.-bot. Ges. Wien, XV, 1865, p. 444.

2. *Tenagogonus opacus* Champion.

Tenagogonus opacus CHAMPION, Biol. Centr.-Amer., Rhynch., II, 1898, p. 150, pl. 9, figs. 16, 16a.

Three females and two males, Chapada, Brazil, August.

Genus LIMNOGONUS Stål, 1868.

Limnogonus STÅL, Hemip. Fabr., I, 1868, p. 132; Kirkaldy and Torre-Bueno, Proc. Ent. Soc. Wash., X, 1908, p. 210.

Limprotrechus REUTER, Öfv. Finska Vet.-Soc. Förh., XXV, 1882, p. 40.

3. *Limnogonus hyalinus* (Fabricius).

Hydrometra hyalina FABRICIUS, Syst. Rhyng., 1803, p. 258; Champion, Biol. Centr.-Amer., Rhynch., II, 1898, p. 153, pl. IX, fig. 18.

Male, Puerto Suarez, Bolivia, collected by J. Steinbach. Two or three other species of *Limnogonus* have been confused with *L. hyalinus* in the literature.

4. *Limnogonus lotus* White.

Limnogonus lotus WHITE, Journ. Linn. Soc. Lond., XIV, 1879, p. 488.

Three specimens, from Santarem, Brazil, Dec. 15, 1909. These examples are somewhat immature, but apparently belong to this species.

5. *Limnogonus recurvus*, sp. nov.

Brownish fuscous to dark brownish fuscous, the abdomen almost blackish. Pronotum darker on the anterior lobe, broadly margined with flavous behind, the sides along the anterior lobe with a broad whitish vitta, two short, broad stripes on the anterior lobe (one on each side of the middle) and a narrow, long, median line extending from the basal portion of the anterior lobe to the apex, yellowish. Head with a transverse line at the base and a longitudinal line on each side near the eyes, yellowish. Abdomen fuscous-black, with a median longitudinal yellowish stripe extending from base of mesonotum to apex. Sides of head silvery pubescent. Connexivum above blackish fuscous, broadly marked with yellowish and silvery pubescence on each segment. Rostrum extending onto basal portion of mesosternum, brownish testaceous, the apical segment black; the first segment almost three times as long as second; third long, extending beyond anterior coxæ; fourth short. Body beneath yellowish testaceous, with sericeous pubescence, the sides of mesothorax below pronotum brownish to brownish fuscous; darker on propleura. Sides of abdomen with a broad brownish black to black vitta. Antennæ brownish fuscous, the terminal segments a little darker, first segment considerably curved near base. Anterior legs brown, the femora moderately incrassate, lighter beneath; tibiæ slightly bowed, a little shorter than femora; tarsi darker. Posterior legs brown. All acetabula, coxæ, and trochanters marked with dark brown. Length, 9.16 mm.; width, 1.60-1.90 mm.

Male: Antennal formula, 100:74:56:82. Connexivum very prominently marked with silvery pubescence. Posterior portion of meso- and metasternum strongly depressed in the middle, last ventral truncate, subequal in length to the two preceding segments; first genital segment beneath with a large, rounded, somewhat conical

process in front of the apex, the hind margin triangularly produced with a prominent, ventrally projecting, slightly recurved flattened hook at the tip; the genital segments hairy.

Female: Antennal formula, 100:66:55:85. Connexivum marked with yellowish and sericeous pubescence, the median stripe of abdomen a little more prominent than in male. Connexivum broadly triangularly produced beyond the abdomen. Last ventral nearly as long as the two preceding segments, moderately produced at the middle and roundly excavated at the sides. Metasternum strongly depressed behind.

Holotype, male, and *allotype*, female, Chapada, Brazil, Aug., H. H. Smith collector, Carnegie Museum. *Paratypes*, one male and four females taken with type, in collections of Carnegie Museum and authors. The macropterous form is unknown. The differently formed male genital segments readily separate this species from its congeners.

6. *Limnogonus profugus*, sp. nov.

Similar to *L. recurvus*, sp. nov. in size, general color and markings, but readily separated from it by the genitalia of male, the different proportional lengths of the antennal segments and the broad black upper margins of the sides of the thorax. Pronotum a little darker anteriorly than in *recurvus*, with a yellowish brown vitta along each side in front, the margins behind the anterior lobe fulvous. Dorsal markings similar to those in *recurvus*. Antennæ dark brown, the terminal segments darker; proportions, 95:67:58:71. Rostrum extending onto basal portion of mesosternum, the apex black. Body beneath reddish brown with sericeous pubescence; sides of abdomen with a broad black stripe, the latter a little broader and darker in the female than in the male. Sides of thorax blackish. Legs dark brown, the base of anterior femora, coxæ and trochanters yellowish brown. Wings brownish black.

Female: Last ventral about a half longer than the preceding segment, broadly, deeply, and roundly emarginate on each side, thus leaving the central portion and the connexivum produced and terminating acutely. A little more robust than male.

Male: Last ventral very deeply and roundly emarginate at the middle, about one and one-half times as long as the preceding segment. Genital segments plump, without keel or knob, the first segment transversely depressed near the base and roundly excavated at the apex. Length, 10.20-10.60 mm.; width, 1.60 mm.

Holotype, macropterous male, Chapada, Brazil, Aug.; *allotype*, female, Chapada, March; both in Carnegie Museum. *Paratype*, Corumbá (highland), Brazil, authors' collection. This species and the preceding are much more robust than *hyalinus* and in addition they have differently formed male and female genital segments.

Genus CYLINDROSTETHUS Fieber, 1860.

Cylindrostethus FIEBER, Europ. Hemip., 1860, p. 33.

Hydrobates ERICHSON, in Schomburgk's Faun. Brit. Guiana, III, 1848, p. 614 (*Preoccupied*).

7. *Cylindrostethus regulus* (White).

Hydrobates regulus WHITE, Journ. Linn. Soc. Lond., Zool., XIV, p. 488.

Nova Olinda, Rio Purús, Brazil, S. M. Klages, June, 1922. Rufotestaceous, with prominent brownish or fuscous markings; antennæ largely brownish black, the apical portion of first segment, except extreme apex, and basal portion of second, lighter; lengths of segments as in the following species. Pronotum with the lateral stripes slightly paler than in *C. linearis*; dorsum of abdomen brownish black with a more or less indistinct median pale line. Connexivum in both male and female terminating in a very short sharp spine. Last ventral of male very broadly, deeply, and roundly emarginated and somewhat depressed at the apex, the sides sinuate; the first genital segment plump, roundly emarginate behind; the last segment terminating in a long sharp spine. Length, 18.50-20.00 mm.

A series of fifteen specimens, collected on the same stream in Brazil as White's types.

8. *Cylindrostethus linearis* (Erichson).

Hydrobates linearis ERICHSON, in Schomburgk's Faun. Brit. Guiana, III, 1848, p. 614.

This species may be separated from the preceding by the totally black antennæ, whose proportions (56:23:17:25) are about the same, and the presence of a small elongate patch of rather long, sub-erect, bristly, brown hairs on each side of the mesonotum about one-third of the distance from the base. The thorax with a very broad brownish black stripe on each side; dorsum of abdomen brownish black. Connexivum thickened at apex and drawn out on each side into a rather long spine,

the spines fuscous and coming together at their tips. Female with first genital segment ending above in a short, black-pointed process; last segment with the terminal long spine almost fuscous. First genital segment beneath strongly depressed on each side and with more bristly brown spines near the apex than in the preceding. In *C. regulus* the first genital of the female is plump and the terminal spine is only about two-thirds as long as in *C. linearis*. Length, 19 mm.

Brazanca, Pará, Brazil, Dec. 29, 1909. One female.

Genus BRACHYMETRA Mayr, 1865.

Brachymetra MAYR, Verh. Zool.-bot. Ges. Wien., XV, 1865, p. 445.

9. ***Brachymetra albinervis*** (Amyot et Serville).

Halobates albinervis AMYOT ET SERVILLE, Hist. Nat. Ins. Hem., 1843, p. 412.

Three examples: Sapucay, Paraguay, April 4, 1909; Rio Coite, Brazil, Nov. 6, 1908.

XVIII. NOTES ON SOME SOUTH AMERICAN NABIDÆ,
WITH DESCRIPTIONS OF NEW SPECIES (HEMIPTERA)*

BY HALBERT M. HARRIS

Through the courtesy of Dr. W. J. Holland, Mr. H. G. Barber, and Dr. Edward Wagner the writer has been privileged to study small collections of *Nabidæ* belonging respectively to the Carnegie Museum, the American Museum of Natural History, and the Hamburg Zoölogical Institute. It is upon these collections that the following notes and descriptions are largely based. The writer desires to express to the above his appreciation of their kindness in submitting to him their undetermined *Nabidæ* for study, and to Dr. C. J. Drake, who has instigated many loans of material on his behalf.

Genus PACHYNOMUS Klug.

Subgenus CAMAROCHILUS subg. nov.

Pronotum arched, the sides constricted. Hemelytra longer than in typical subgenus, the coriaceous part more developed, its apex not so transverse, the membranal suture of the one hemelytron being in a straight line away from and parallel to the claval suture of the opposite hemelytron when the wings are normally folded on the back. Metapleuron flat, longer than broad. Second and third segments of intermediate and posterior tarsi subequal in length.

Type of subgenus, *P. (Camarochilus) americanus* sp. nov.

The following two closely related species are the first and only known American members of the subfamily *Pachynominae* Stål. This group may be briefly differentiated from the *Nabinae* and *Prosterninae* by the distinctly five-segmented antennæ and the absence of ocelli and metapleural orifices. It closely approaches the *Reduviidæ* in many characters. Heretofore the single genus, *Pachynomus* Klug, has contained four species inhabiting the Oriental and Ethiopian regions. The American representatives described below differ in certain characters from the Old World forms, and it is for these new species that the above subgenus is erected.

*Contribution from the Department of Zoology and Entomology, Iowa State College, Ames, Iowa.

1. *Pachynomus (Camarochilus) americanus* sp. nov.

Oblong-oval, widened behind, moderately shiny, clothed with very fine, short, pale pubescence, also with some long, fine hairs. Brown, the head at base, pronotum, scutellum in greater part, and apical margins of segments of venter darker fuscous brown to sordid black. The basal half of collum, antennæ, rostrum, a triangular patch on basal half of connexival segments (excepting the last), anterior femora (excepting wide apical ring, which is prolonged basally on anterior and posterior sides into broad stripes), intermediate and posterior femora (excepting broad apical rings), and all coxæ, trochanters, tibiæ, and tarsi, yellowish testaceous. Head longer than broad (36:26), the anteocular part almost parallel-sided; vertex narrow (9), arched; postocular part very short, obliquely narrowed to basal constriction. Eyes moderately large, the width of each scarcely equal to that of vertex, the length faintly less than depth (13:15). Antennæ with first segment thick, scarcely attaining apex of head, second and third of equal thickness, fourth and fifth fine, thread-like, the three apical segments rather thickly clothed with fine hairs; proportion of segments, 12:32:31:26:(38?). Rostrum reaching between anterior coxæ, the second segment hardly surpassing insertion of antennæ, the third stout, twice as long as the second (25:12).

Pronotum broader than long (57:35), the collar angularly widened at the middle, the groove limiting it continued backward as a deep median longitudinal furrow, the posterior lobe marked off by a deep, convexly arcuate depression which ends on the sides before reaching the margin; the sides strongly narrowed anteriorly, sinuate, feebly margined in front of constriction; anterior lobe on each side near the middle with a wide shallow depression, its sides finely rugulose; posterior lobe finely longitudinally rugulose, the disc slightly depressed on each side before humeri, the basal margin strongly concave, thus leaving the mesoscutum widely exposed. Scutellum arched, with a median longitudinal keel bounded on each side along the basal half by a furrow. Hemelytra finely granulose, devoid of all but the very finest of hairs, the veins prominently raised, straight, unbranched, those of corium and clavus paralleled by rows of coarse punctures; embolium strongly widened distally, its apex as broad as that of corium, reaching as far as penultimate connexival segment, without evidence of transverse plica marking off cuneus; membrane fuscous, attaining tip of abdomen, with two elongate cells from the apex of the outer of which there extends a single vein.

Legs moderately long, the anterior and intermediate femora armed within with short, peg-like, brownish teeth and long, rigid setæ, the anterior ones greatly incrassate, as seen from the side, only about two and a half times as long (measured above) as deep (59:24). Anterior and intermediate tibiæ slightly curved (the latter more faintly so) and armed within with short teeth, their apices provided with small

pads. The second and third segments of intermediate and posterior tarsi subequal in length. Metapleuron flat, rugulose, without ostiole. Venter with the segments transversely ridged before their bases, thickly pilose, the second visible segment on each side toward the median line with a small, sunken, shiny spot, from which arises a very long fine hair; each succeeding segment with a similar pair of spots, which are placed progressively farther outward, those of the last segment being on the sides in line with the connexivum. Length, 8.6 mm.; width, 3 mm.

Holotype, male, La Chorrera, Panama, May 12, 1912.

2. *Pachynomus (Camarochilus) confusus* sp. nov.

Closely allied to *P. americanus* sp. nov., with which it agrees in general form and color. However, slightly larger, the anterior femora longer, with the dark markings extending inward much beyond middle and occupying the greater portion of femora as seen from above, the median pronotal groove more profound, with a distinct zigzag line along its bottom, the depressions on the anterior lobe of pronotum sharper and deeper, and the median length of basal lobe distinctly greater. The apical half of the scutellum is coarsely punctate. The last connexival segment is provided in the female (mutilated in male) with the pale triangular patch, so that in this species there are six pale spots on the connexivum (only five in *americanus*). Length, 9.2-9.8 mm.; width, 3.3-3.42 mm.

Holotype, male, Santarem, Brazil, in collection of Carnegie Museum. *Allotype*, female, taken with type, in author's collection.

3. *Pagasa luteiceps* (Walker).

1873. *Prostemna luteiceps* WALKER, Cat. Hemp. Heter. Br. Mus., VII, p. 135.
1899. *Pagasa luteiceps* CHAMPION, Biol. Centr. Amer., Heter., II, p. 298; Pl. XVIII, figs. 16-16a.
1909. *Pagasa luteiceps* REUTER ET POPPIUS, Acta Soc. Sci. Fenn., XXXVII, No. 2, pp. 26-27.
1928. *Pagasa luteiceps* HARRIS, Entomologica Americana, IX, p. 21; Pl. IV, fig. 2.

Three macropterous examples of this species are at hand from Chapada, and Rio de Janeiro, Brazil, and Cacagualito, Colombia. They differ in no essential way from a specimen from Tobago Island, Panama (male) and a specimen from Barro Colorado Island (female) before me. The third rostral segment is slightly longer than the second, and the fourth just attains the apex of the anterior coxæ.

4. *Pagasa bimaculata* sp. nov.

Sub-elongate, smooth, pilose, and also sparsely setose, shiny; the scutellum, hemelytra, (excepting broad costal margins along basal two-thirds) and mesopleura dull; piceous to brown, the head and hemelytra marked with yellowish. Head piceous brown, the upper surface, (excepting a median longitudinal spot at base of tylus and a basal bifurcate patch extending around inner margin of eyes to sides), more or less luteous; longer than broad (40:32), the length of anteocular portion from eyes to base of rostrum greater than width of vertex (17:14). Eyes large, placed with their hind margins on basal constriction of head, the length of one two-thirds greater than its width (15.9) and slightly less than its depth (17). Ocelli large, pale. Antennæ yellowish brown, the apical segments paler, pilose, the third and fourth segments and the base of the fifth segment also with long, fine hairs; proportional lengths of segments, 15:6:33:35:34. Rostrum pale brown, the first segment yellowish above, extending to the mesosternum; the first segment as broad as long, the second reaching base of head; proportions: II; III; IV = 36:32:15.

Pronotum smooth, broader than long (79:57), the anterior lobe deep piceous black, with a large reddish brown triangular patch at apex; posterior lobe deep brown, the transverse impression separating it from anterior lobe fine, beset with numerous punctures; basal margin deflexed, strongly and rather sharply emarginate in front of middle of scutellum. Scutellum brown, the base and sides darker and provided with several coarse deep punctures; the disc bifoveate near the middle, clothed with numerous long semi-erect brownish hairs; the apex truncate. Hemelytra brown, darkened apically and along veins, a large nearly circular patch occupying outer portion of corium and inner apical angle of embolium, fulvous; a small somewhat transverse spot on suture at base of outer cell of membrane, yellowish; sparsely clothed with semi-erect fuscous hairs; the inner margin of clavus with a row of coarse punctures, the outer vein of clavus and also the inner vein of corium likewise bounded on each side with a row of coarse punctures. Membrane reaching upon the penultimate abdominal segment, fuscous brown, the interior cell only about half as broad as the outer two cells. Legs brownish, the outer surface of anterior femora, the tibiæ, and tarsi paler; anterior femora strongly incrassate, nearly three times as long (from above) as deep (55:20), armed beneath with numerous piceous teeth; anterior tibiæ strongly widened on apical half, serrately dentate within; the trochanters of all legs and the intermediate (basally) and posterior femora with a few short, piceous teeth; intermediate and posterior tibiæ thickly setose, armed along anterior margins with two rows of stout spines. Mesosternum sulcate anteriorly. Venter brown, pilose, the segmental sutures paler. Length, 12 mm.; width, 3.65 mm.

Described from a macropterous female (*holotype*), Chapada, Brazil, October; in collection of the Carnegie Museum.

This species is the largest known member of the genus, and is to be readily recognized by its size and coloration and moreover by the armature of the intermediate and posterior femora. It pertains to the typical subgenus in which the second segment of the rostrum attains the base of the head and in which the hemelytra are more or less opaque with their veins obsoletely developed.

5. *Pagasa similis* Poppius.

1914. *Pagasa similis* POPPIUS, Ann. Mus. Zool. Acad. Sci., XIX, p. 136.

Chapada, Brazil. Two brachypterous females, which differ from Poppius' description only in that the hemelytra extend slightly beyond the apex of the second, reaching on to the true third segment of the abdomen, and the membrane slightly over-reaches the apex of the corium. The punctures along the claval and corial veins are indistinctly seen on the finely wrinkled hemelytra. The membrane is slightly more developed in one example than in the other.

A macropterous female (*morphotype*) from Jatahy, Prov. Goyas, Brazil, is in my collection. Except for the development of the wings and the pronotal changes resulting therefrom, this individual does not differ structurally from brachypterous specimens. In coloration, however, it is darker throughout, the pale markings of the hemelytra being obscure, but nevertheless present on the base of the clavus and slightly outward along the suture. The legs are fuscous to piceous brown, only the trochanters, extreme apices of femora, and middle of anterior tibiæ and tarsi being paler. The rostrum and antennæ likewise are darker. The species was originally described from a single brachypterous female from "Obidios, Amazonas."

Macropterous form: Hemelytra fully developed, finely wrinkled throughout, with a very few fine, short, recumbent hairs, the claval vein with a long upright seta before its base, the veins raised, prominent; membrane attaining apex of abdomen, fuscous, the veins distinct. Pronotum broader than long (45:40), the lobes of equal height, the sides feebly margined. Length, 6.8 mm.; width, 2.3 mm.

6. *Nabis capsiformis* Germar.

1837. *Nabis capsiformis* GERMAR, Silberm. Revue Ent., V, p. 132.
1872. *Nabis kinbergi* REUTER, Öf. Vet. Akad. Förh., XXIX, No. 6, p. 90.
1928. *Nabis capsiformis* HARRIS, Entomologica Americana, IX, pp. 36, 64; Pl. III, fig. 4.

Examples of this more or less cosmopolitan species are at hand or have been examined from the following South American localities: Argentina, Rio Bermejo, Prov. Salta., May, 1914, (Steinbach); Buenos Aires; Brazil, Santarem, Corumbá, and Rio de Janeiro; Peru, Arica.

7. *Nabis sordidus* Reuter.

1872. *Nabis sordidus* REUTER, Öf. Vet. Akad. Förh., XXIX, No. 6, p. 85.
1872. *Nabis pallescens* REUTER, *ibid.*, p. 85.
1899. *Nabis sordidus* CHAMPION, Biol. Centr.-Amer., Heter., II, p. 303; Pl. XVIII, figs. 26-28.
1928. *Nabis sordidus* HARRIS, Entomologica Americana, IX, p. 41; Pl. II, fig. 3.

Specimens of this species, which is common in Eastern North America as far north as Maine, have been seen from Brazil. There are examples in the Hamburg Museum from San José, Costa Rica, and a macropterous female in the Carnegie Museum from Chapada, Brazil. The writer has previously recorded it from Panama, Guatemala, Mexico, and the West Indies.

8. *Nabis roripes* Stål.

1860. *Nabis roripes* STÅL, Rio Janeiro Hemip., I, p. 70.
1890. *Nabis roripes* REUTER, Rev. d'Ent., IX, p. 297.
1908. *Nabis roripes* REUTER, Mem. Soc. Ent. Belg., XV, pp. 99, 101.

For a long time the writer sought specimens from tropical localities which might represent this species, but invariably the few examples secured proved to be no more than the common *N. sordidus* Reuter. It was with much elation, therefore, that he discovered in a collection sent from the Hamburg Zoölogical Museum a single female from Colombia, which seemed to be the true *roripes*. Subsequently, a nice series of adults and nymphs belonging to the Carnegie Museum and the American Museum of Natural History came to hand. The species runs directly to *sordidus* Reuter in my key (*l.c.*, 1928, p. 34).

It may be recognized, however, by the almost uniform sordid brown venter, the shorter hemelytra of the brachypterous form, which reach on to the middle of the first dorsal segment of the abdomen, and by the larger more prominent eyes. The male clasper is quite similar to that of *N. deceptivus* Harris (*l.c.*, p. 45, Pl. II, fig. 5).

Specimens (brachypterous) are at hand from Chapada, Brazil, and Pandi, Colombia (Cundinamarca) W. Fritsche.

9. *Nabis spinicrus* Reuter.

1890. *Nabis spinicrus* REUTER, Rev. d'Ent., IX, p. 305.

1894. *Coriscus signatus* UHLER, Proc. Zool. Soc. Lond., 1894, p. 205.

1899. *Nabis signatus* CHAMPION, Biol. Centr. Amer., Heter., II, pp. 302, 304; Pl. XVIII, figs. 31-33.

1908. *Reduviolus spinicrus* REUTER, Mem. Soc. Ent. Belg., XV, p. 103.

1928. *Nabis spinicrus* HARRIS, Entomologica Americana, IX, p. 47; Pl. II, fig. 7.

Four examples, macropterous, Chapada, Brazil. The claspers of the males, of which there are three, are identical with those of specimens from Cuba, Grenada, Panama, Guadeloupe, and Hayti, including cotypes of *signatus* Uhler, in my collection. The species was originally described from Brazil. Two females respectively from Pará and Santarem, Brazil, in the Carnegie Museum, are doubtfully referred to this species.

10. *Nabis seticrus* sp. nov.

Slender, elongate, pilose; yellowish testaceous, the sides and under surface of head and also a median divaricate line above on the head, a pattern on anterior lobe of pronotum, five short longitudinal spots on posterior lobe, the base and extreme apex of scutellum, irregular patches on the abdomen above, a distally widened longitudinal spot on the inner half of the connexival segments and a broad longitudinal stripe on each side of venter, more or less embrowned or infuscated. Meso- and metasternum fuscous. Antennæ pale testaceous, the apex of the second segment and all of the third and fourth darker. Legs pale, a band before the apex of the femora, a similar sub-basal band on the tibiæ, and the apices of tibiæ and tarsi brownish. Head much longer than broad (23:17), the postocular part long, parallel-sided. Eyes large, prominent, the length of one slightly greater than width of vertex (8:7). Ocelli distinct and fairly conspicuous. Antennæ long, length of the first segment more than twice as great as width of head through eyes; proportion of segments—(♂) 35:48:53:40, (♀) 39:57:55:44. Rostrum attaining apex of intermediate coxæ, the second seg-

ment slightly longer than the third (24:20), the fourth half as long as the third.

Pronotum slightly longer than broad (σ , 26:23), the sides almost straight, strongly converging anteriorly, the width at collar (13) one-half as great as median length, the disc flat, the two lobes of equal height, collar and posterior lobe distinctly punctate. Scutellum small, longer than broad, with a distinct depression behind the base. Hemelytra reaching on to the middle of third dorsal segment, the lateral margins slightly ciliate, the commissure scarcely longer than scutellum; membrane narrow, extending very slightly beyond apex of corium, its length slightly greater than that of commissure. Legs long, clothed with numerous long, fine, almost erect hairs, also with short, fine, more recumbent pubescence, the anterior tibiae throughout and the anterior and intermediate femora beneath, thickly beset with rather short hairs, which are recurved or hooked at the apex; the four anterior legs armed and provided with fossae as in *N. spinicrus* Reuter. Abdomen slightly widened at the middle, thickly and finely pubescent. Male genital segments long, the clasper with much narrower and more recurved blade than in *N. spinicrus* Reuter. Length, (σ - φ) 6.1-7.6 mm.; width, 1.2-1.6 mm.

Holotype, male, and *allotype*, female, Chapada, Brazil; in collection of Carnegie Museum. *Paratypes*, one male and seven females, taken with type, and one male, Rio Janeiro, Prov. Salta, Argentina, May, 1914, Steinbach, in collections of Carnegie Museum and the writer; two males and one female, Chapada, in collection of the American Museum of Natural History.

This easily recognized species belongs to the subgenus *Lasiomerus* Reuter and indeed is most closely related to the *N. spinicrus* of that author, with which it agrees in the possession of the long, rigid, spine-like setae of the four anterior legs. It may be differentiated from *spinicrus* by the differently constructed hemelytra (which may prove to be variable, when more material is known) of the brachypterous form; the slightly larger body; longer legs and antennae; and the differently constructed male claspers. The macropterous form is not known. The lengths of the antennal segments are slightly variable.

XIX. THE SYSTEMATIC STATUS AND BREEDING HABITS OF *EUPEMPHIX TRINITATIS* BOULENGER.

BY M. GRAHAM NETTING.

Many workers have studied the breeding habits of *Eupemphix pustulosus*, but to the best of my knowledge no observations on the related species, *E. trinitatis*, have ever been published. Undoubtedly the most detailed study of *E. pustulosus* is the one which Breder made in Panama, the salient features of which have been reported by Noble¹. The following notes, admittedly incomplete, may be of interest since they indicate that these species, which are structurally much alike, have similar breeding habits.

My observations were made on the island of Trinidad during September 1927, and during short visits in October 1929 and February 1930. All of my specimens were taken in St. George County about ten miles from Port-of-Spain, collections being made both in the lowlands at St. Augustine at an elevation of approximately one hundred feet and at Mount St. Benedict in the northern mountain range at various altitudes up to nine hundred feet.

Eupemphix trinitatis was described by Boulenger² in 1889 on the basis of four specimens from Port-of-Spain. Ten years later Werner³ described *Bufo atrigularis* from Trinidad. This name has been appropriately referred to the synonymy of *E. trinitatis*. Lutz in several recent papers has considered *E. trinitatis* a synonym of *E. pustulosus*. In this matter I am unable to agree with him for reasons which I have outlined below, and which I will consider in detail in a later paper. In order to determine the status of *E. trinitatis* I examined all of the specimens of *Eupemphix* from Mexico, Panama, Colombia, and Venezuela in the collection of the Museum of Zoölogy of the University of Michigan, all of the material from Venezuela and Trinidad in the collection of the Carnegie Museum, and four specimens from Trinidad in the collection of the United States National Museum. I studied thirty-three specimens from Trinidad, twenty-seven from

¹Noble, G. K. 1927. Annals N. Y. Acad. Sci., vol. XXX, pp. 87-88, fig. 17.

²Boulenger, G. A. 1889. Ann. & Mag. Nat. Hist., [6], vol. III, pp. 307-308.

³Werner, F. 1899. Verh. zool.-bot. Ges. Wien, vol. XLIX, pp. 470-484.

Venezuela, fifty from Colombia, and large series from Panama. Early in the investigation I discovered that two very distinct forms were included under the name *E. pustulosus*. Specimens from Panama are strikingly different from those from eastern Colombia. I was unable to locate the type specimen of *Paludicola pustulosa*, which came from western Colombia, but Cope's original description referred to the Panamanian type. Accordingly I named the eastern Colombian specimens *E. ruthveni*.⁴ The new form is very close to *E. trinitatis*, but is sufficiently distinct to be recognized. It is true that Venezuelan specimens of *E. ruthveni* are harder to distinguish from *E. trinitatis* than are Colombian specimens, and individual specimens might be confused, but the examination of a series from both areas shows constant differences. Specimens of *E. ruthveni* from the region of Caracas in Venezuela are larger on the average than *E. trinitatis*, tend to be darker dorsally, have a more noticeable pectoral spot, show a more distinct vertebral stripe, which extends further forward, have fewer linear warts, and display a much greater variation in ventral markings, ranging from immaculate on the belly to a pattern of dark round spots, which greatly exceed those of *E. trinitatis* in size. If Lutz had only Venezuelan material for comparison with *E. trinitatis*, it is easy to understand why he referred this species to what was then *E. pustulosus*. Certainly no one would confuse *E. pustulosus*, as now defined, with *E. trinitatis*. To summarize: *E. pustulosus* ranges from Mexico south to western Colombia and overlaps the range of *E. ruthveni* for an unknown distance in eastern Colombia; *E. ruthveni* ranges from eastern Colombia through Venezuela; and *E. trinitatis* is restricted to Trinidad and Tobago.

At this time it might be well to call attention to certain inaccuracies in the original description of *E. trinitatis*. Boulenger⁵ states "male with a large external vocal sac on each side of the throat and brown rugosities on the inner side of the inner finger." It is easy to understand the misconception as to the vocal sac for I have seen two much-shriveled males in which the skin composing the sac is gathered in folds only on the sides and is quite smooth in the middle.

Two different color phases occur in this species, among the males at least. Werner's description of *Bufo atrigularis* seems to be based

⁴Netting, M. Graham. 1930. Ann. Carn. Mus., vol. XIX, No. 3, pp. 167-168. Pl. VII.

⁵Boulenger, G. A., 1889, Ann. & Mag. Nat. Hist., [6] vol. III, p. 308.

upon the common or uniformly-marked phase. Preserved specimens of this phase are generally uniform light gray dorsally but may be uniform dark gray or brown. Boulenger's description of *E. trinitatis* refers to the rarer, brightly-marked phase, which shows contrasted dorsal markings even in alcoholic specimens. Twenty-six of twenty-eight males, which I examined, belong to the uniformly-marked phase, and five females are similar except that the entire region of the throat is red-brown and the median ventral stripe is more distinct than in the males. The following color description is taken from living specimens of the two phases.

Uniform phase: Uniform olive or brown above; a cream-colored line less than 5 mm. long extending forward from the region of the ischial symphysis sometimes present; parotoid and dorso-lateral glands lighter in color than the back; limbs with dark brown or blackish cross bars; plantar surfaces and lower surfaces of hind legs purplish; chin region gray or brown; anterior half of vocal sac black, and posterior half olive or lighter; belly white or cream with many small brown spots which increase anteriorly to form a more or less solid color over the breast; general appearance of ventral surface gray or brown; median line of white or cream distinct anteriorly, indistinct over the vocal sac, distinct on the breast, and lost in the light color of the belly; upper lip with two or three dark bars; a faintly outlined diamond sometimes visible behind the head; and a dark blotch on each side of the back posteriorly.

Contrasted phase: Two broad, cream-colored dorso-lateral stripes join anteriorly and cover the head and neck; central portion of the back behind and between these stripes brown; ground-color of upper surfaces of the hind legs orange; elbow and dorso-lateral glands very light-colored, and with a trace of orange; vertebral stripe narrow, but extending further forward, sometimes complete.

The sexes are markedly different in size. Twenty-eight males averaged 27.8 mm. in length, while five females averaged 31.9 mm.

This toad has been taken in Trinidad in St. George County at Port-of-Spain, St. Augustine, Mount St. Benedict, and Arima; in Mayaro County at Guayaguayare, which is at the extreme south-eastern corner of the island; and in Tobago at Milford Bay. It is surprisingly rare in collections, and is apparently secured only when it comes to the water to breed.

Since there are no published notes upon the habitat of this species some mention should be made of the marked preference for muddy or foul water which it exhibits. The few cases in which individuals were taken in clear water may be disregarded, for in every instance the

toads had fallen into concrete basins from which they could not escape to more suitable breeding spots. I collected specimens in foul sewers, in roadside drainage ditches, in ditches of muddy water about construction projects, and in kitchen and laundry drains which were full of soapy water. In many cases the walls of the ditches were so steep that the subsequent escape of adults and young appeared impossible. I never found individuals in a natural pool or stream, although frequently such habitats were separated by only a few feet from the artificial pools which were in use. At one place a large roadside gutter emptied into a good-sized stream of clear water. *Eupemphix* bred in the gutter, but did not occur along the stream. Apparently the factor of current is of small moment, for I found egg-masses both in quiet water and in places where there was considerable current. I believe that this is a good example of an amphibian which has adopted a man-made habitat much as the Chimney Swift and Nighthawk have done. Probably this toad bred originally in quiet, leaf-cluttered pools of stagnant water, in hoof-prints along game trails, and in any temporary pools which were foul or muddy. *Eupemphix ruthveni* and *E. pustulosus* are known to breed in forest pools at the present time, but I am sure that a careful study of these species will indicate that *Eupemphix* chooses the leaf-filled pools rather than the clear pools which are chosen by such forms as *Hyla rosenbergi*. Females of *Eupemphix* are always hard to obtain, because they dive at the first sign of danger and remain hidden in the muddy water, or under debris in the pool.

The breeding season of *E. trinitatis* probably coincides with the duration of the rainy season. During 1927 breeding activities were in full swing throughout September, and in 1930 I collected calling males as late as February 15th, although I saw no egg-masses. The following observations upon life-history were entirely made during 1927, since my more recent visits to Trinidad were too brief to allow further work of this type.

At a distance of several hundred yards the call sounded much like the bark of a small dog. At close quarters it sounded like "ow-w-w-w-ác." The Trinidad bushmen, who apparently know this toad only by its voice, call it the "coong-la," presumably for onomatopoeic reasons. I heard full choruses only at night, although the toads sometimes called during the afternoon. When calling the males faced the bank, rested their forelegs upon it, and floated in the water with

only the forepart of their bodies above the surface. If the flashlight was focused directly upon an individual, it remained in place and sometimes continued calling, but if the light merely brushed a specimen it would dive and either swim to the opposite bank or come up in the middle and float.

I heard *trinitatis* on September 2nd, my first evening in the field. The rains had begun at this time, and many pools of ground water were in evidence. In a steep-sided ditch twenty-five feet in length and three feet wide I collected ten males, and failed to secure about as many more. No egg-masses were present at this time. I was unable to visit the same ditch again until September 13th, when I found eight egg-masses in the ditch. Six of these were two or three days old, and the remaining two had been laid the previous night. The same day I found a fresh egg-mass in a small gutter containing only three inches of water. On the 16th and 19th I found fresh masses at other places.

Every egg-mass which I saw was attached to a shale or clay bank. In several cases growing plants were stuck to the mass, but the evidence indicated that this was purely accidental. When laid the masses floated on the water, but in some cases the water level dropped several inches in following days and the masses were left suspended above the water. I do not know whether tadpoles which hatch in such masses wait for a rain to wash them out of the froth or not. Certainly those which hatched in the laboratory entered the water as soon as they could work their way through the froth.

At 11 p. m. on September 16th I took a clasping pair which I placed in a small jar in the laboratory. By seven o'clock the next morning all of the eggs had been laid and most of them beaten into the froth. The entire jar was filled with froth, so I judge that the crowded quarters had prevented the toads from beating all of the mass. The eggs are laid in a clear, sticky jelly. One or both of the parents then beat the jelly into foamlike froth. The bubbles of the froth are quite small and the entire mass is the size of a baseball. The eggs are light-colored, but faintly greenish in cast, so that they can be distinguished from the pure white froth. Ten fresh eggs averaged 1.5 mm. in diameter. Of two masses, which I kept, one produced four hundred and fifty-two and the other three hundred and three tadpoles.

Oviposition occurs late at night. From thirty-six to forty-eight hours later tadpoles can be observed moving in the egg-mass. From fifty to sixty hours after the eggs have been laid tadpoles enter the

water. Those from eggs which are close to the water work their way through the froth first, and those which come from eggs in the upper portion of the mass may not reach the water until as much as twenty-four hours later.

Newly hatched tadpoles, measured after preservation, have a total length of about 7 mm. and a body length of about 2 mm. These tadpoles feed readily upon bread crumbs. Tadpoles a week old measure from 10-12 mm. in length and have a body length of 4-5 mm. My observations were unfortunately terminated at this time so I cannot say when metamorphosis occurs.

In conclusion then: *Eupemphix trinitatis* is a valid form, which differs from the recently described mainland form, *E. ruthveni*. It lays from three hundred to four hundred and fifty eggs in a frothy mass in small pools of muddy or foul water. The masses are attached to the banks of the breeding pools, and the tadpoles enter the water about three days after egg-laying.

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